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THE AMERICAN
# JOURNAL OF PHARMACY

*MAY, 1920*

## EDITORIAL.

### A NEW LAW COVERING THE SALE OF DISTILLED SPIRITS AND WINES FOR MEDICINAL PURPOSES ENACTED IN NEW JERSEY.

At this year's session of the New Jersey legislature the following law was enacted and having received the approval of the Governor will become operative on July 4th.

AN ACT to restrict the sale at retail of distilled spirits and wines for medicinal purposes to bona fide prescriptions and to define the prescribing and dispensing of these as in performance of professional duty and not in violation of prohibition enactments.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. On and after the passage of this act, it shall not be lawful for any druggist, except a pharmacist registered as such in accordance with the law of this State and engaged at the time in the actual practice of pharmacy, to sell at retail distilled spirits and wines and

the sale shall be made only on a bona fide prescription written by a licensed practitioner of medicine engaged at the time in the practice of his medical profession. Distilled spirits and wines may be prescribed by such medical practitioner when in good faith he believes that the use of alcoholic liquors as a medicine is indicated and only after a personal physical examination of the patient or after consultation with another practitioner who has made a personal physical examination of the patient, and the prescription shall be written in duplicate, the prescriber retaining one copy, and there shall be written thereon the name and address of the patient for whom prescribed, and the name and address of the prescriber, and the prescription shall not be filled more than once, and there shall not be prescribed for the same patient for internal administration more than one pint of distilled spirits within any period of ten days, and the liquor prescribed can be consumed only by the patient named in the prescription, and the pharmacist filling the prescription shall preserve it for at least two years on a separate file kept for prescriptions for distilled spirits and wines, and all such files and records shall be open at all time to the inspection of any authorized officer of the law.

2. The prescribing and dispensing of alcoholic liquors on bona fide prescriptions in accordance with the provisions of this act shall be deemed and is hereby defined as in performance of the professional duty of the medical practitioner and the pharmacist, and the pharmacist shall not by reason of such professional duty be classified as a dealer in alcoholic beverages nor shall he be subject to the license fees that are exacted of dealers in alcoholic beverages, nor shall the dispensing of alcoholic liquors in the discharge of his professional service be construed as violating the provisions of the enactments of this State or of any political subdivision thereof enacted for the purpose of restricting and controlling the sale and use of alcoholic liquors as beverages and commonly spoken of as local option and prohibition laws; *provided*, that nothing in this act shall be construed as preventing the sale and use of alcohol when properly medicated and sold in accordance with the regulations of the Bureau of Internal Revenue of the Treasury Department of the United States nor with the manufacture, sale and use of denatured alcohol, nor with manufacture, sale and use of wines for sacramental and like religious rites in accordance with the Federal statutes.

3. Any person violating any of the provisions of section one of

this act shall be guilty of a misdemeanor and upon conviction shall be subject to a fine of not more than one hundred dollars, and any medical practitioner or any pharmacist who is convicted more than once of violating the provisions thereof may have his license to practice in this State revoked.

This act was designed to serve several purposes all of which we believe will be to the benefit of the professional practice of pharmacy. It aims to prevent the unscrupulous medical practitioner or druggist engaging in the nefarious "booze business." It restricts the sale of distilled spirits and wines for medicinal purposes to prescriptions written in good faith by the physician in attendance when indicated by the physical condition of the patient. In harmony with the Federal statute and regulations, it limits the amount that can be so dispensed and prescribes the procedures that must be followed by both physician and pharmacist. The penalties provided for violating any of the provisions relating to dispensing should be sufficient to deter any one from such infraction, as he becomes liable to a fine for each irregularity of this type and further upon more than one conviction for such offenses the physician or pharmacist may have his license to practice in the State revoked.

Under the existing laws and regulations of the U. S. Treasury, every pharmacist who dispenses distilled spirits or wines, even though such dispensing be done only on bona fide prescriptions, becomes a retail liquor dealer and must qualify and pay the stamp tax as such before dispensing any prescriptions for these or for pure alcohol intended for external application.

Paragraph 12, Sec. 1001 of the Revenue Act of 1918 pro-

vides further that "every person carrying on the business of retail liquor dealer in any state, territory, or district of the United States contrary to the laws of such state, territory, or district, or in any place therein in which carrying on such business is prohibited by local or municipal law, shall pay, in addition to all other taxes, special or otherwise, imposed by existing law or by this act, $1,000."

In many sections of New Jersey local option laws have been adopted and as these, as a rule, do not exempt pharmacists in the dispensing of prescriptions for liquors, it is apparent that in such districts the pharmacist who wished to quality to fill such bona fide prescriptions would be prevented by the prohibitive tax of $1,000 plus the normal Federal Stamp Tax of $25 paid by the pharmacist situated in a nearby municipality where a local option law had not been adopted. It is manifestly unfair to the patients that they should not be able to have their medical needs supplied near home and also that such discrimination should exist between pharmacists engaged in business in the same State.

One of the prime objects of this law was to provide for the exemption of pharmacists in the dispensing of distilled spirits and wines needed for strictly medicinal purposes from the provisions of local option or prohibition laws already enacted in the State or subdivisions thereof. By this act, such legitimate prescribing and dispensing is defined as coming within the professional duties of the physician and the pharmacist and the latter is exempted by the State from the odium of being classified as a dealer in alcoholic beverages and from the license fees and penalties exacted under these laws. Under this construction, the pharmacist in dispensing in accordance with the provisions of the act, which to all intents and purposes are the same as those of the Volstead Act, *is not carrying on the business of a retail liquor dealer contrary to laws of the State or place therein*

*in which carrying on such business is prohibited by local or municipal law and, consequently, he should not have to pay the additional tax of $1,000 as provided by the Revenue Act of 1918.*

The law enacted in New Jersey may possibly serve as a model for similar enactments in other states where prohibition laws act as barriers to the necessary dispensing of such medicines.

G. M. B.

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## TESTIMONIAL DINNER FOR JOHN URI LLOYD.

The bestowal of the Remington Honor Medal in Pharmacy for the second time was made the occasion for a testimonial dinner in honor of Prof. John Uri Lloyd, the recipient. The presentation was at an adjourned meeting of the New York Branch of the A. Ph. A. held at Hotel Pennsylvania, New York, on Monday evening, April 19. Nearly one hundred representative pharmacists from New

JOHN URI LLOYD, PH.M.

York, Pennsylvania and New Jersey gathered at this function to do honor to the guest of the occasion.

Prof. William C. Anderson presided and acted as toast master. The presentation was made in a masterly address by Dr. Jacob Diner, who reviewed the impressions that the work of Professor Lloyd had very early in his own pharmaceutical career made upon

him and the widespread influence that the scientific investigations and literary contributions of this eminent worker had exerted in fields that were at times beyond the boundaries of pharmacy. Notably among such was his early contributions and researches on colloidal chemistry which were now being fully recognized as among the original and fundamental studies in this interesting branch of chemistry.

In responding Professor Lloyd announced that this was his seventy-first birthday and that but for this event he should have been at home enjoying the felicitations of his home circle. He was in one of his most happy moods and delightfully reminiscent and in his own inimitable manner gave his audience an insight into his early induction into the trials and tribulations of the embryo pharmacist of nearly sixty years ago and the difficulties that he experienced in learning the art of the apothecary. He referred to the unexpected incidents in his early career that had impelled him to continue in pharmacy and how these had led him up to this occasion and the honor, which he believed would not have come to him except through the guidance of the unseen influence and the preordination of the unexpected events depicted that had determined his future.

Among others who briefly responded, at the toastmaster's request, and voiced in appropriate remarks their tributes and appreciation of the life-time research studies of Professor Lloyd were Dean Charles H. La Wall, President Edward A. Sayre, of the New Jersey Pharmaceutical Association, Editor E. G. Eberle of the *Journal of the American Pharmaceutical Association*, President Robert S. Lehman, of the New York State Pharmaceutical Association, Professor Charles Baskerville of New York, and George M. Beringer of Camden, N. J.

Regrets at unavoidable absence were received from Professors Henry H. Rusby and E. Fullerton Cook.

---

## A CONTRIBUTION TO THE PHARMACOLOGY OF COTTON ROOT BARK.

By Charles R. Eckler, M.S.

### PURPOSE.

Cotton root bark has been used as a medicine for many years by the negroes of the South, and it is stated that they brought the knowledge of the drug with them from Africa. The drug has been

used as a substitute for ergot by some physicians who have claimed that its action resembles that of ergot, and that it has the advantage over the latter of being safer and more stable. This use of cotton root bark has been very largely of an empirical nature, for very little experimental work on animals has been reported and the most of this has seemed unfavorable to the use of the drug. The majority of the clinical reports have also seemed unfavorable. At a comparatively recent date, however, J. C. Scott published a favorable report regarding the action on the cat's uterus.[1] This author states that "gossypii cortex is stable and very active." In the two experiments which he reports, one on the isolated and one on the intact uterus, he seems to have used a powdered extract of the root bark suspended in Ringer's solution, which, in the case of the isolated uterus was applied directly to the organ, and in the case of the intact uterus was apparently given intramuscularly. It became of interest, therefore, to know more about the activity of cotton root bark, as compared with that of ergot in particular, and to some extent with that of pituitary extract. It became of interest, also, to learn whether or not there was any distinct difference in activity between the "green" and the "dried" bark of commerce, and whether or not drug collected at the time of flowering would be more active than the commercial drug which is, in either the case of the "green" or the "dried," collected after the cotton is harvested, and further, whether or not different varieties of the cotton plant would show any distinct difference in activity. The purpose of this work was to gain more definite knowledge regarding these points.

## MATERIAL.

Several commercial samples of "green" and "dried" root bark were tested, and in addition, samples of thirteen different varieties of the cotton plant. The latter were carefully collected at the time of flowering. They were obtained by Mr. F. A. Miller, of our botanical department, from the Georgia Agricultural Experiment Station. Fluidextracts or modified fluidextracts of the drug, only, were tested. Aqueous suspensions of powdered extract were not employed. A part of the commercial "dried" barks were extracted with a menstruum of alcohol and glycerin, 3 to 1, and a part with 75% alcohol. The "green" barks were extracted with the alcohol-glycerin, and the thirteen samples were extracted with 75% alcohol.

Fluidextracts of ergot were used for comparison. These were

made from commercial lots of drug, by extraction with 50% alcohol.

The pituitary extracts used in comparative tests were either samples of commercial extract, or laboratory extractions of commercial lots of glands.

## METHODS.

It was decided to test the activity of cotton root barks by the methods commonly employed for the testing of ergot, namely, the cock's comb, blood pressure, and uterus methods. These methods as carried out in this work are briefly as follows:

### COCK'S COMB METHOD.

The cock's comb method consists in administering to pure-bred, single-comb, white leghorn roosters, by injection into the pectoral muscles, gradually increasing or diminishing doses of fluidextract until a slight but distinct and unmistakable bluing of the comb points has been produced. This method is simple and rapid, and has been reported as giving results which seem to run closely parallel to those obtained by the intact uterus method. Perhaps no other method is so commonly employed for the testing of ergot. The end-point, unlike that of the other methods, is a purely visual one.

### BLOOD PRESSURE METHOD.

The blood pressure method consists in recording the change in carotid pressure caused by the intravenous injection of the fluidextract by way of the saphenous vein. Young, medium sized dogs are the subjects preferred. These have seemed to give the most satisfactory records when anaesthetized with morphine sulphate (0.010 to 0.012 G. per Kg.) and hyoscine hydrobromide (0.000,064 to 0.000,128 G. per Kg.). Ether is used for the operation of inserting cannulae, etc., but is withdrawn as soon as the apparatus is set up and running. Artificial respiration is established in all cases. The common mercury manometer was employed in this work. The doses of fluidextract, calculated per Kg. of body weight, were diluted for injection with one or two times their volume of salt solution.

A few experiments were carried out on decapitated dogs and cats, prepared according to the method of Sherrington.[2]

The blood pressure method, essentially as described, is a commonly employed laboratory method for studying the effect of drugs on the circulation. It has been used extensively for determining the pressor effect of preparations of ergot.

### THE ISOLATED UTERUS METHOD.

The isolated uterus method consists in recording the movements of isolated horns of the virgin guinea pig's uterus. These muscular segments are kept bathed in warm, oxygenated Locke's solution, and at intervals the drug to be tested is added to the Locke's solution in quantitative manner. The segment being attached to a writing lever, any contractions or relaxations caused by the application of the drug are recorded on a smoked surface. (A more detailed description of the method and apparatus may be found in THIS JOURNAL, 89: 195, 1917; and in the *Jour. Lab. and Clin. Med.*, 2: 819, 1917.)

The isolated uterus method is commonly employed for determining the value of pituitary extracts. The method is also used for testing ergot and other drugs which cause, by their application, a change in the contractility of involuntary muscle.

### THE INTACT UTERUS METHOD.

The intact uterus method consists in recording the movement of the uterus in situ caused by the intravenous injection of the drug, usually by way of the jugular vein. The animal, anaesthetized with one of the soporific drugs such as acetoform or paraldehyde, is partly immersed in a saline bath of body temperature. The uterus is exposed under the salt solution and attached to a Cushny single myocardiograph or similar instrument, which records, on a smoked surface, any movement of the organ.

The intact uterus method is a very useful one for studying the qualitative action of those drugs which are used in medicine for their effect on this organ. It seems to be the most logical one for this purpose. As a method of quantitative assay, where many injections have to be made, it is perhaps less serviceable than the isolated uterus method, for the factors governing the uterus are less under control and the organ is influenced to a greater extent by the cumulative action of previous doses of the drug.

### RESULTS OF COCK'S COMB EXPERIMENTS.

The fowls to be used for the testing of cotton root bark were either given, or had been given, doses of ergot. The results of these tests were desired to serve as a control. Fowls

vary in their resistance to drugs and occasionally, although rather rarely, one will find combs which do not become distinctly blue after ergot, the effect being more of a blanching. These control tests showed that the combs could be blued by small to medium doses of ergot.

TABLE 2. COCK'S COMB TESTS ON COTTON ROOT BARK.

A fluidextract of commercial, dried cotton root bark, made with a menstruum of alcohol and glycerin (3 to 1), gave the following results on the fowls previously tested with ergot:

| Fowl | Weight in Kg. | Dose per Kg. | Results |
|---|---|---|---|
| 394 | 1.545 | 1.0 c.c. | No noticeable bluing of comb |
| 386 | 1.544 | 1.0 c.c. | " " " " " |
| 388 | 1.460 | 1.5 c.c. | " " " " " |
| 393 | 1.388 | 2.0 c.c. | " " " " " |
| 397 | 1.665 | 2.0 c.c. | " " " " " |
| 384 | 1.705 | 2.5 c.c. | " " " " " |
| 388 | 1.467 | 2.5 c.c. | " " " " " |
| 391 | 1.661 | 3.0 c.c. | " " " " " |
| 396 | 1.706 | 3.0 c.c. | " " " " " |
| 398 | 1.690 | 3.0 c.c. | " " " " " |
| 400 | 1.507 | 3.0 c.c. | " " " " " |
| 501 | 1.644 | 3.0 c.c. | Very faint bluing of comb |
| 502 | 1.553 | 4.0 c.c. | Extremely faint bluing of comb |
| 503 | 1.532 | 5.0 c.c. | Faint bluing of comb |

A fluidextract of commercial, "green" cotton root bark, made with a menstruum of alcohol and glycerin (3 to 1), gave results as follows:

| Fowl | Weight in Kg. | Dose per Kg. | Results |
|---|---|---|---|
| 511 | 1.703 | 1.0 c.c. | No noticeable bluing of comb |
| 515 | 1.532 | 1.0 c.c. | " " " " " |
| 512 | 1.586 | 2.0 c.c. | " " " " " |
| 516 | 1.688 | 2.0 c.c. | " " " " " |
| 530 | 1.630 | 2.0 c.c. | " " " " " |
| 514 | 1.441 | 3.0 c.c. | " " " " " |
| 517 | 1.337 | 3.0 c.c. | " " " " " |
| 524 | 1.498 | 3.0 c.c. | " " " " " |
| 518 | 1.576 | 3.0 c.c. | " " " " " |
| 511 | 1.635 | 3.0 c.c. | " " " " " |
| 512 | 1.578 | 3.0 c.c. | " " " " " |
| 515 | 1.528 | 3.0 c.c. | " " " " " |
| 516 | 1.662 | 3.0 c.c. | " " " " " |
| 385 | 1.715 | 3.0 c.c. | Extremely faint bluing of comb |

The commercial drug did not, in any case, produce bluing of the cock's comb in doses smaller than 3 c.c. per Kg. The dose of ergot required for these same fowls was from 0.50 to 1 c.c. Other symptoms were evident, however, such as blanching of the comb, wattles, and areas about the eyes, drooping of the feathers, dyspnoea and diarrhoea. With doses of 4 and 5 c.c. per Kg. the fowls seemed very sick, and while slight bluing was produced, the end point was so indefinite that a quantitative assay by this method seemed to be quite impossible. Doses of 2 and 3 c.c. per Kg. of each of the thir-

teen samples were then given to fowls, the combs of which had previously been blued by small doses of ergot. From the results shown in Table 3 it may be seen that none of the thirteen samples were distinctly active in bluing the comb in doses of 3 c.c. per Kg. This dose is four times the amount which was required of fluidextract of ergot to produce a distinct bluing in the same fowls. Testing by the cock's comb method was therefore discontinued.

*Table 3*

Tests on Samples of Different Varieties of Cotton Root Bark, Collected at Flowering

*Cock's Comb Method*

| Sample | Fowl | Weight | Dose per Kg. | Results |
|---|---|---|---|---|
| No. 1 | 540 | 2.000 | 2 c.c. | No noticeable bluing of comb. |
| | 544 | 1.713 | 3 c.c. | " " " " " |
| No. 2 | 535 | 1.424 | 2 c.c. | " " " " " (?) (Cold) |
| | 548 | 1.785 | 3 c.c. | " " " " " |
| No. 3 | 545 | 1.921 | 2 c.c. | " " " " " (Redder) |
| | 540 | 1.404 | 3 c.c. | " " " " " |
| No. 4 | 541 | 1.852 | 2 c.c. | " " " " " (Redder) |
| | 541 | 1.923 | 3 c.c. | " " " " " |
| No. 5 | 554 | 1.703 | 2 c.c. | " " " " " (Redder) |
| | 535 | 1.547 | 3 c.c. | " " " " " |
| No. 6 | 548 | 1.908 | 2 c.c. | " " " " " |
| | 545 | 1.924 | 3 c.c. | " " " " " Warm red |
| No. 7 | 540 | 1.957 | 2 c.c. | " " " " " (?) (Cold) |
| | 541 | 1.981 | 3 c.c. | " " " " " (?) (Cold) |
| No. 8 | 541 | 1.859 | 2 c.c. | " " " " " (?) (Cold) |
| | 540 | 2.106 | 3 c.c. | " " " " " (?) (Cold) |
| No. 9 | 545 | 1.871 | 2 c.c. | No noticeable bluing of comb. |
| | 548 | 1.776 | 3 c.c. | " " " " " (?) (Cold) |
| No. 10 | 545 | 1.342 | 2 c.c. | " " " " " |
| | 544 | 1.746 | 3 c.c. | " " " " " (?) (Cold) |
| No. 11 | 535 | 1.342 | 2 c.c. | " " " " " |
| | 535 | 1.584 | 3 c.c. | " " " " " (?) (Cold) |
| No. 12 | 544 | 1.678 | 2. cc. | " " " " " |
| | 539 | 1.716 | 3 c.c. | " " " " " (?) (Cold) |
| No. 13 | 548 | 1.866 | 2 c.c. | " " " " " |
| | 546 | 1.775 | 3 c.c. | Extremely faint bluing of comb (?) |

In the cases marked (?) there seemed to be a mere suggestion of bluing, so faint, however, that it could not be distinguished with certainty. No. 13 with 3 c. c. was the most pronounced of these.

## BLOOD PRESSURE EXPERIMENTS.

Before presenting the results of blood pressure experiments on cotton root bark, results of normal blood pressures of anaesthetized dogs were observed in order to determine with what regularity the normal pressure would run when recorded by the method and apparatus employed. Such results may be seen in Table 4. Slight variations in pressure would probably be recorded with the best of apparatus and under the most careful technic. Occasionally, however, more pronounced changes may be caused by a slight movement of the animal as happened in experiment 786. A somewhat more

disturbing change is such as may be seen in experiment 788, where there is for some little time a slight but gradual fall in pressure, and in 779, where there is a slight but gradual rise. In both cases, however, the pressure ran with fair uniformity after the 10 minute period. In experiment 767 a slight rise appears after the 20 minute period. No cause can be assigned for these changes except by supposing that the force or rate of the respiration was not such as to quite accommodate the needs of the particular animals. These points should be considered when viewing Table 6, 6A and 6B, which show the results of blood pressure experiments on cotton root bark. Three of the kymograms may be seen, also, in Chart 1.

*Table 4* *Records of Normal Blood Pressures of Dogs*
(Morphine-Hyoscine Anaesthesia)
Pressure given in millimeters
Kymograms

| Time | 767 Dog 10.2 Kg. | 773 Dog 8.3 Kg. | 788 Dog 11.6 Kg. | 775 Dog 6.2 Kg. | 779 Dog 19.3 Kg. | 786 Dog 10 Kg. |
|---|---|---|---|---|---|---|
| Start | 110 | 119 | 148 | 125 | 104 | 123 |
| 5′ | 108 | 120 | 138 | 115 | 117 | 120 |
| 10′ | 110 | 127 | 135 | 106 | 127 | 117 |
| 15′ | 110 | 124 | 132 | 105 | 133 | 114 |
| 20′ | 109 | 125 | 130 | 105 | 133 | 120 |
| 25′ | 116 | 122 | 130 | 105 | 134 | animal |
| 30′ | 116 | 122 | 129 | 106 | 135 | moved |
| 35′ | 119 | 118 | 127 | 119 | 134 | 141 |
| 40′ | 122 | 117 | 126 | | 134 | 139 |
| 45′ | 122 | 118 | 126 | | 134 | 135 |
| 50′ | 122 | 118 | 128 | | 134 | |
| 55′ | 120 | 114 | 127 | | 138 | |
| 60′ | 118 | 116 | | | 138 | |
| 65′ | 115 | 115 | | | 138 | |
| 70′ | 113 | 115 | | | | |
| 75′ | 112 | 118 | | | | |
| 80′ | 109 | | | | | |
| 100′ | 111 | | | | | |
| 115′ | 107 | | | | | |

A few blood pressure tracings were made, showing the effect of ergot, in order to compare the action of cotton root bark with that of ergot on the circulation, and to show how extensively the normal pressure may be influenced. Table 5 shows the results of six ergot blood pressure experiments and gives one a fair idea of the great elevation in pressure which is almost invariably produced by carefully prepared fluidextracts of this drug.

*Table 5*
*Blood Pressure Records on Samples of Fluid Extract of Erogt, Taken on Dogs*

| Dog Wt. in Kg. | Dose per Kg. | Normal Pressure | Pressure at Periods After Injection of Drug 1–3′ | 5′ | 10′ | 15′ | 20′ | 25′ | 30′ |
|---|---|---|---|---|---|---|---|---|---|
| 12.7 | .05 c.c. | 147 | 225 | 218 | 187 | 187 | 185 | 178 | 174 |
| 10.6 | .05 c.c. | 147 | 237 | 226 | 206 | 195 | 189 | 188 | 185 |
| 14.4 | .05 c.c. | 150 | 214 | 214 | 200 | 176 | 167 | (150at42′) | |
| 6.6 | .10 c.c. | 144 | 263 | 220 | 204 | 190 | 188 | 181 | |
| 10.5 | .10 c.c. | 129 | 175 | 198 | 190 | 184 | 182 | 180 | |
| 22.2 | .10 c.c. | 144 | 190 | 172 | 220 | 234 | 220 | 216 | 210 |

*Table 6*

*Blood Pressure Records of Thirteen Samples of Cotton Root Bark on Dogs*

| Drug | Dose per Kg. | Pressure at Start | Pressure at Periods After Injection 1–3′ | 5′ | 10′ | 15′ | 20′ | 25′ | 20′ |
|---|---|---|---|---|---|---|---|---|---|
| (Kymogram 736. Dog Wt. 12 Kg. Morphine S.-Hyoscine HBr. anaesthesia.) | | | | | | | | | |
| Cotton R. No. 1 | .1 c.c. | 120 | 124 | 118 | clot | 104 | | | |
| | .2 c.c. | 100 | 116 | 107 | 114 | 114 | | | |
| F. E. Ergot | .05 c.c. | 115 | 153 | 131 | 133 | | | | |
| (Kymogram 772. Dog Wt. 10.5 Kg. Morphine S.-Hyoscine Hbr.) | | | | | | | | | |
| Cotton R. No. 1 | .05 c.c. | 135 | 138 | 135 | 132 | 130 | | | |
| | .1 c.c. | 130 | 142 | clot | 130 | 134 | 134 | | |
| | .2 c.c. | 127 | 145 | 123 | 126 | | | | |
| (Kymogram 773. Dog Wt. 8.3 Kg. Morphine S.-Hyoscine HBr.) | | | | | | | | | |
| Cotton R. No. 1 | .2 c.c. | 117 | 133 | 117 | 114 | | | | |
| F. E. Ergot | 1. c.c. | 114 | 133 | | | | | | |
| (Kymogram 741. Dog Wt. 8.8 Kg. Morphine S.-Hyoscine Hbr.) | | | | | | | | | |
| Cotton R. No. 2 | 1 c.c. | 137 | 147 | 142 | 145 | 152 | 157 | | |
| | .2 c.c. | 157 | 168 | 153 | 153 | clot | | 143 | |
| F. E. Ergot | .05 c.c. | 143 | 158 | 179 | 164 | 162 | | | |
| (Kmogram 778. Dog Wt. 11.6 Kg. Morphine S.Hyoscine HBr.) | | | | | | | | | |
| Cotton R. No. 2 | .2 c.c. | 127 | 137 | 130 | 126 | 124 | | | |
| F. E. Ergot | .05 c.c. | 124 | 140 | 140 | 140 | | | | |
| | .05 c.c. | 140 | 155 | 148 | 154 | | | | |
| (Kymogram 778-A. Dog Wt. 11.7 Kg. Morphine S-.Hyoscine HBr.) | | | | | | | | | |
| Cotton R. No. 3 | .1 c.c. | 105 | 117 | 108 | 108 | 104 | 103 | | |
| | .2 c.c. | 103 | 122 | 106 | clot | 127 | 119 | | |
| F. E. Ergot | .05 c.c. | 122 | 149 | 134 | 129 | | | | |
| (Kymogram 743. Dog Wt. 8 Kg. Morphine S.-Hyoscine HBr.) | | | | | | | | | |
| Cotton R. No. 3 | .2 c.c. | 126 | 135 | 118 | 118 | 119 | 113 | | |
| | .3 c.c. | 113 | 120 | 105 | 108 | 109 | 112 | | |
| F. E. Ergot | .05 c.c. | 113 | 134 | 129 | 131 | 137 | 133 | 133 | |
| | .1 c.c. | 133 | 160 | 144 | | | | | |
| (Kymogram 779. Dog Wt. 19.3 Kg. Morphine S.-Hyoscine HBr.) | | | | | | | | | |
| Cotton R. No. 3 | .1 c.c. | 138 | 152 | 138 | 140 | 140 | | | |
| (Kymogram 749. Dog Wt. 10 Kg. Morphine S.-Hyoscine HBr.) | | | | | | | | | |
| Cotton R. No. 4 | .1 c.c. | 113 | 128 | 121 | 125 | 124 | 126 | 124 | |
| | .2 c.c. | 124 | 146 | 123 | 131 | 133 | | | |
| (Kymogram 750. Dog Wt. 9.4 Kg. Morphine S.-Hyoscine HBr.) | | | | | | | | | |
| Cotton R. No. 5 | .1 c.c. | 125 | 144 | 135 | 132 | 130 | 130 | 130 | |
| | .2 c.c. | 130 | 148 | 143 | 136 | 133 | 134 | | |
| F. E. Ergot | .05 c.c. | 141 | 198 | 195 | 166 | 166 | 150 | 153 | |
| (Kymogram 751. Dog Wt. 5.9 Kg. Morphine S.-Hyoscine HBr.) | | | | | | | | | |
| Cotton R. No. 6 | .1 c.c. | 149 | 152 | 144 | 150 | 155 | 154 | 154 | |
| | .2 c.c. | 154 | 176 | 154 | 158 | clot | | 141 | |
| F. E. Ergot | .05 c.c. | 130 | 176 | 151 | 154 | 150 | 141 | 136 | |
| (Kymogram 753. Dog Wt. 8.8 Kg. Morphine S.-Hyoscine HBr.) | | | | | | | | | |
| Cotton R. No. 7 | .1 c.c. | 142 | 148 | 146 | 154 | 155 | 155 | | |
| | .2 c.c. | 158 | 164 | 161 | 157 | 152 | 147 | 144 | |
| F. E. Ergot | .05 c.c. | 145 | 168 | 169 | 160 | 158 | 157 | | |
| (Kymogram 756. Dog Wt. 13.6 Kg. Morphine S.-Hyoscine HBr.) | | | | | | | | | |
| Cotton R. No. 8 | .1 c.c. | 121 | 137 | 125 | 122 | 118 | 120 | 122 | |
| | .2 c.c. | 139 | 153 | 136 | 138 | 135 | 132 | 131 | |
| F. E. Ergot | .05 c.c. | 131 | 164 | 188 | 187 | 172 | 166 | 155 | |
| (Kymogram 755. Dog Wt. 14 Kg. Morphine S.-Hyoscine HBr.) | | | | | | | | | |
| Cotton R. No. 9 | .1 c.c. | 124 | 139 | 135 | 136 | 143 | 152 | 153 | |
| | .2 c.c. | 150 | 170 | 150 | 140 | 142 | 139 | 138 | |
| F. E. Ergot | .05 c.c. | 130 | 157 | 137 | 130 | 129 | 130 | 132 | |

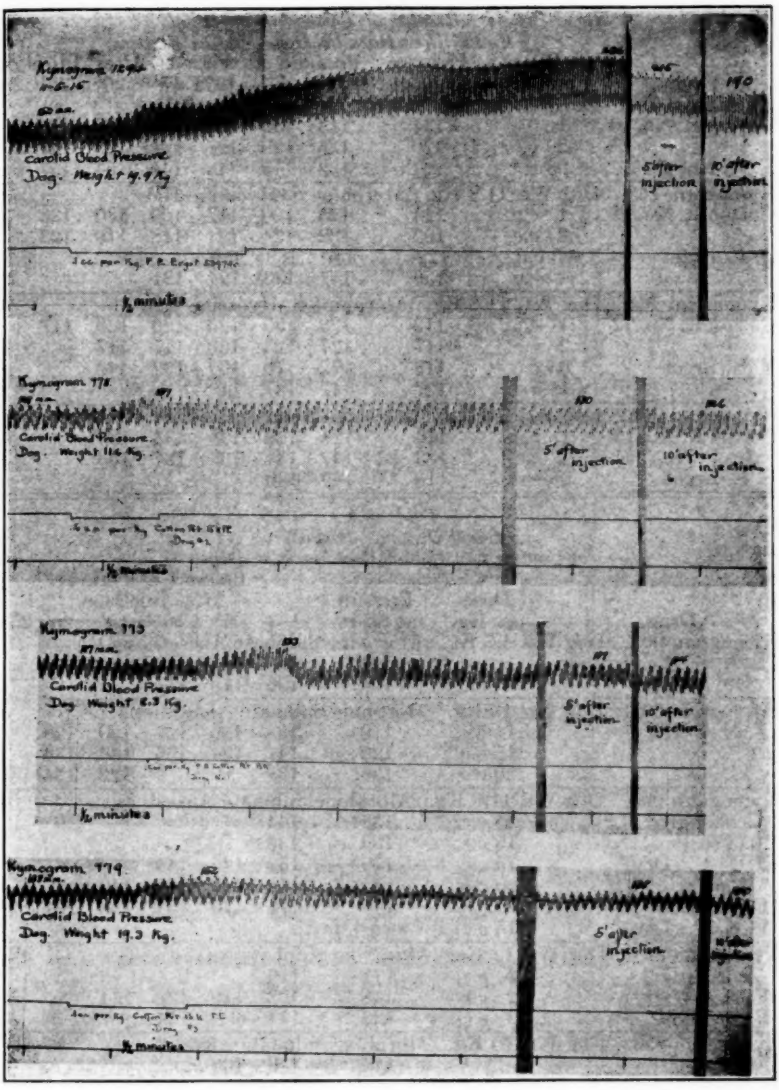


CHART I.

Kymogram 1294 shows the effect of fluidextract of ergot on the blood pressure of the dog.

Kymograms 778, 773 and 779 represent three different blood pressure experiments which show the effect of cotton root bark on the blood pressure of the dog.

*Table 6*
*Blood Pressure Records of Thirteen Samples of Cotton Root Bark on Dogs*

| Drug | Dose per Kg. | Pressure at Start | Pressure at Periods After Injection 1–3′ | 5′ | 10′ | 15′ | 20′ | 25′ | 30 |
|---|---|---|---|---|---|---|---|---|---|
| (Kymogram 759. Dog Wt. 5.5 Kg. Morphine S.-Hyoscine HBr.) | | | | | | | | | |
| Cotton R. No. 10 | .1 c.c. | 134 | 143 | 130 | 132 | 129 | 126 | 120 | |
| | .2 c.c. | 120 | 136 | 128 | 127 | 131 | 129 | 127 | |
| F. E. Ergot | .05 c.c. | 127 | 158 | 145 | 148 | 145 | 154 | 157 | |
| (Kymogram 763. Dog Wt. 11.8 Kg. Morphine S.-Hyoscine HBr.) | | | | | | | | | |
| Cotton R. No. 11 | .1 c.c. | 114 | 125 | 120 | 117 | 123 | 120 | 123 | |
| | .2 c.c. | 123 | 132 | 124 | 121 | 118 | 118 | 122 | |
| F E. Ergot | .05 c.c. | 122 | 140 | 138 | 136 | | | | |
| | .1 c.c. | 136 | 157 | 133 | 124 | 121 | | | |
| (Kymogram 764. Dog Wt. 11.2 Kg. Morphine S.-Hyoscine HBr.) | | | | | | | | | |
| Cotton R. No. 12 | .1 c.c. | 112 | 123 | 135 | 120 | 120 | 120 | 117 | |
| | .2 c.c. | 117 | 127 | 123 | 126 | 117 | 117 | | |
| F. E. Ergot | .05 c.c. | 118 | 172 | 170 | 169 | 152 | 140 | | |
| | .1 c.c. | 127 | 147 | 137 | 142 | | | | |
| (Kymogram 765. Dog Wt. 8.9 Kg. Morphine S.-Hyoscine HBr.) | | | | | | | | | |
| Cotton R. No. 13 | .1 c.c. | 116 | 124 | 129 | 128 | 133 | 133 | | |
| | .2 c.c. | 133 | 147 | 141 | 137 | 137 | 133 | | |
| F. E. Ergot | .05 c.c. | 116 | 140 | 140 | | | | | |

*Table 6-A*
*Blood Pressure Records of Commercial Cotton Root Bark on Dogs*

| Drug | Dose per Kg. | Pressure at Start | Pressure at Periods After Injection 1–3′ | 5′ | 10′ | 15′ | 20′ | 25′ |
|---|---|---|---|---|---|---|---|---|
| (Kymogram 902. Dog Wt. 4.7 Kg. Morphine Sulphate Anesathesia.) | | | | | | | | |
| F. E. C. (Dry) | .1 c.c. | 144 | 160 | 145 | 143 | 134 | | |
| 40′ later = | .1 c.c. | 106 | 126 | 118 | 117 | | | |
| (Kymogram 901. Dog Wt. 10 Kg. Morphine Sulphate Anaesthesia.) | | | | | | | | |
| F. E. C. (Dry) | .1 c.c. | 110 | 138 | 136 | 127 | 120 | 120 | |
| | .15 c.c. | 120 | 147 | 134 | 136 | 136 | 136 | |
| | .20 c.c. | 136 | 138 | | | 122 | 134 | 131 |
| (Kymogram 900. Dog Wt. 11.8 Kg. Morphine Sulphate Anaesthesia.) | | | | | | | | |
| Alcohol-glyc. | .15 c.c. | 136 | 144 | | | | | |
| (3 to 1) | .15 c.c. | 136 | 136 | | | | | |
| F. E. C. (Dry) | .15 c.c. | 143 | 159 | 145 | 145 | | | |
| | .20 c.c. | 145 | 158 | 122 | 141 | 140 | | |
| F. E. Ergot | .15 c.c. | 140 | 178 | 170 | 158 | 158 | 151 | 149 |
| F. E. C. (Dry) | .15 c.c. | Caused death | | | | | | |
| (Kymogram 894. Dog Wt. 12 Kg. Morphine Sulphate Anaesthesia.) | | | | | | | | |
| Alcohol-glyc. | .2 c.c. | 111 | 119 | | | | | |
| F. E. C. (Dry) | .2 c.c. | 118 | 128 | 119 | 120 | 114 | | |
| F. E. Ergot | .2 c.c. | 123 | 114 | clot | 124 | | | |
| (Kymogram 893. Dog Wt. 10 Kg. Morphine Sulphate Anaesthesia.) | | | | | | | | |
| Adrenal Ext. | | 116 | 146 | 130 | | | | |
| F. E. C. (Dry) | .1 c.c. | 129 | 138 | 114 | 110 | | | |
| | .15 c.c. | 110 | 115 | clot | 112 | 95 | | |
| | .2 c.c. | 103 | 110 | 101 | 101 | | | |
| | .3 c.c. | 101 | Fall | Slow recovery. | | | | |
| (Kymogram 891. Dog Wt. 7 Kg. Morphine Sulphate Anaesthesia.) | | | | | | | | |
| Adrenal Ext. | | 135 | 157 | 143 | 143 | | | |
| F. E. C. (Dry) | .2 c.c. | 143 | 164 | 143 | 140 | | | |
| | .2 c.c. | 139 | 150 | 120 | 117 | 123 | 126 | |
| | .2 c.c. | 126 | 136 | 124 | 127 | 127 | | |
| | .3 c.c. | Gradual fall for 5′ then slow recovery. | | | | | | |
| F. E. Ergot | .15 c.c. | Fall, slight rise, then gradual lowering. | | | | | | |

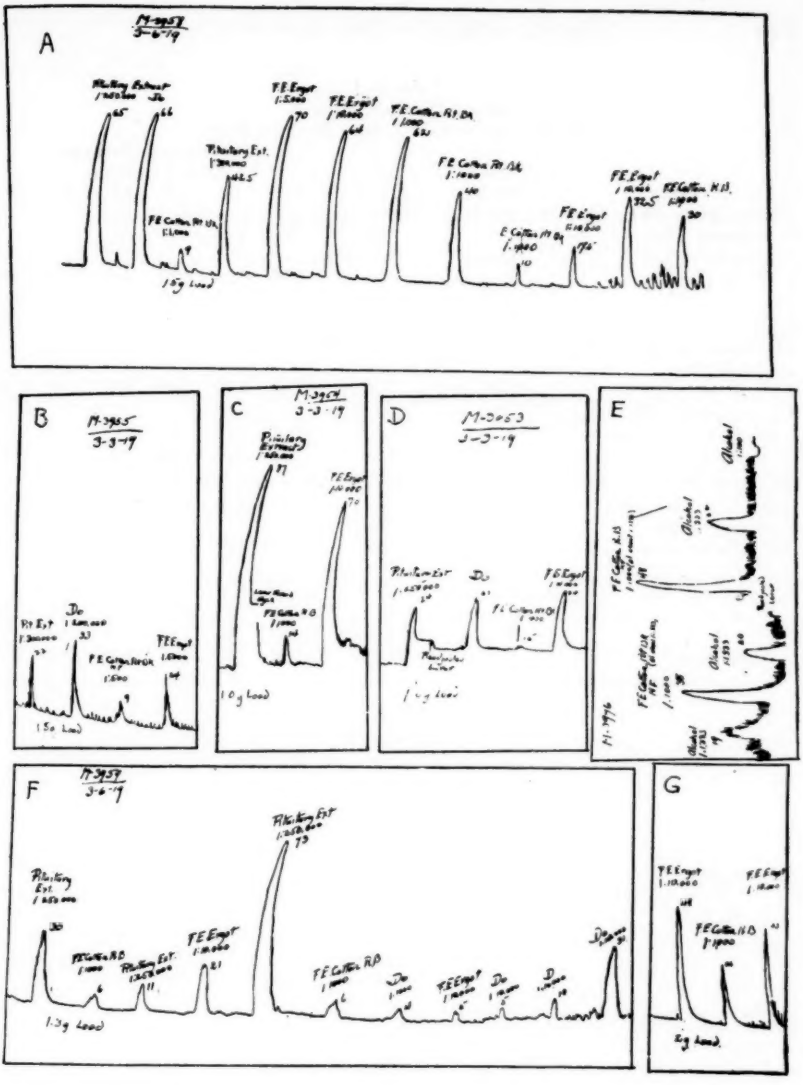


CHART 2.

This chart shows the whole or a part of the kymograms taken in 7 experiments on the isolated, guinea pig's uterus. Contractions 7, 8 and 9 in A show the diminishing effect of succeeding doses of cotton root bark. Compare contractions 6 and 10 for the effect of ergot before and after cotton root bark. Note the first four contractions for comparison of cotton root bark with pituitary extract. Kymograms B, C, D and F. G and others show a comparison with ergot. F shows a diminished effect of pituitary extract after cotton root bark and an increased effect after ergot. E gives the effect of alcohol and shows that the effect of cotton root bark must be discounted to the extent of the effect of the alcohol.

*Table 6-A*
*Blood Pressure Records*
*of Commercial Cotton Root Bark on Dogs*

| Drug | Dose per Kg. | Pressure at Start | Pressure at Periods After Injection 1–3′ | 5′ | 10′ | 15′ | 20′ | 25′ |
|---|---|---|---|---|---|---|---|---|
| (Kymogram 890. Dog Wt. 8.6 Kg. Morphine Sulphate Anasethesia.) | | | | | | | | |
| Adrenal Ext. | | 143 | 170 | 140 | | | | |
| Alcohol-glyc. | .3 c.c. | No effect | | | | | | |
| F. E. C. (Dry) | .2 c.c. | 146 | 155 | 128 | 126 | clot | 132 | 122 |
| | .3 c.c. | 122 | 140 | 84 | 93 | clot | 102 | 107 |
| F. E. Ergot | .15 c.c. | Slight rise, then gradual fall. | | | | | | |
| (Kymogram 691. Dog Wt. 10.8 Kg. Morph. S.-Hyoscine HBr.) After Ergot. | | | | | | | | |
| F. E. C. (Dry) | .05 c.c. | 125 | 135 | 130 | 128 | 125 | 123 | 122 |
| (Kymogram 892. Dog Wt. 27.4 Kg. Morph. S.-Atropine S.) | | | | | | | | |
| F. E. C. (Green) | .2 c.c. | 143 | 154 | 146 | 146 | 142 | 144 | |
| F. E. Ergot | .1 c.c. | 144 | 210 | 210 | 204 | 200 | 202 | |
| (Kymogram 982. Dog Wt. 11 Kg. Morph. S.-Hyoscine HBr. Cut Vagi.) | | | | | | | | |
| F. E. C. (Green) | .2 c.c. | 122 | 144 | 126 | 127 | | | |
| Alc.-glycerin | .2 c.c. | No effect | | | | | | |
| F. E. Ergot | .05 c.c. | 132 | 190 | 163 | 156 | 135 | 130 | |
| F. E. C. (Green) | .2 c.c. | No effect | | | | | | |
| (Kymogram 895. Dog Wt. 2.7 Kg. Morph. S.-Atropine S.) | | | | | | | | |
| F. E. C. (Green) | .2 c.c. | 112 | 134 | 132 | 132 | 134 | 134 | 130 |
| | .2 c.c. | 130 | 148 | 124 | 124 | 118 | 112 | 112 |
| F. E. Ergot | .1 c.c. | 112 | 154 | 138 | 131 | 120 | 119 | 119 |

*Table 6-B*
*Blood Pressure Records*
*of Commercial Cotton Root Bark on*
*Spinal Preparations*

| Drug | Dose per Kg. | Pressure at Start | Pressure at Periods After Injection 1–3′ | 5′ | 10′ | 15′ | 20′ | 25′ |
|---|---|---|---|---|---|---|---|---|
| (Kymogram 896. Preparation Wt. 2.2 Kg. Cat.) | | | | | | | | |
| F. E. C. (Dry) | .2 c.c. | 82 | 46–69 | 62 | 67 | | | |
| F. E. Ergot | .2 c.c. | 17 | 38–138 | 134 | 126 | 110 | 100 | 78 |
| F. E. C. | .2 c.c. | Abrupt fall. Heart stopped. Epinephrin was given and the heart massaged. Heart began beating. Later ergot caused a rise in pressure. | | | | | | |
| (Kymogram 898. Preparation Wt. 2.4 Kg. Cat.) | | | | | | | | |
| Alc.-glyc. (3 to 1) | .16 c.c. | 58 | 60 | 56 | | | | |
| F. E. C. (Dry) | .16 c.c. | 58 | 48 | 46 | | | | |
| F. E. Ergot | .08 c.c. | 44 | grad. rise | 80 | 75 | 66 | | |
| F. E. C. | .16 c.c. | 64 | Fall. Heart stopped. Massaging and epinephrin started heart. | | | | | |
| F. E. C. | .08 c.c. | Gradual fall. | | | | | | |
| F. E. C. | .08 c.c. | Pressure fell nearly to zero, heart stopped but recovered after massaging and epinephrin. | | | | | | |
| (Kymogram 4015. Dog preparation Wt. 7.4 Kg.) | | | | | | | | |
| F. E. C. (Dry) | .10 c.c. | 65 | 70–63 | 56 | 51 | | | |
| F. E. Ergot | .05 c.c. | 51 | 65–62 | 66 | 65 | 61 | 60 | |
| F. E. C. | .10 c.c. | 60 | 62–59 | 56 | | | | |
| F. E. Ergot | .10 c.c. | 55 | 63–58 | 60 | | | | |
| Pit. Ext. 1:1000 | .20 c.c. | 60 | 63–67 | | | | | |

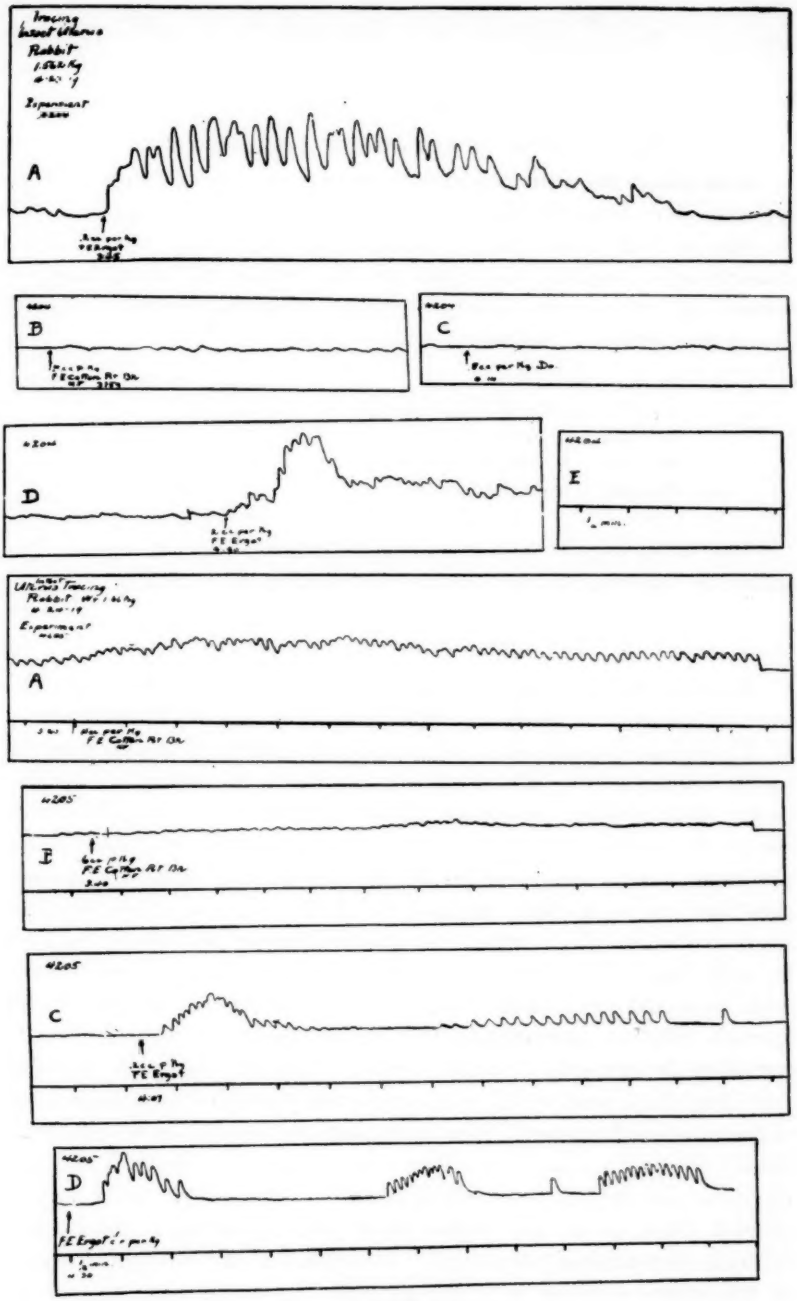


CHART 3.

This chart shows sections of the kymograms of two experiments on the intact uterus of the virgin rabbit. In experiment No. 4204, D seems to show a diminished effect of ergot as compared with A, due to the two injections of cotton root bark shown in B and C. This experiment gives an idea of the relative effect of the two drugs. In experiment 4205, B shows the effect of cotton root bark to be diminished following A, even though the dose was increased.

COTTON ROOT BARK.

BLOOD PRESSURE EXPERIMENTS ON THE CAT.

Four blood pressure experiments were carried out on cats. These animals were anaesthetized with acetoform. In one case 0.2 Cc. per Kg. of F. E. Cotton R. B. caused almost no effect. In the other three cases 0.1 and 0.2 Cc. doses per Kg. caused an abrupt and extensive fall, the pressure slowly regaining the normal height or slightly above the normal. Following is an example:

| | |
|---|---|
| Pressure at start | 86 Mm. |
| 0.13 Cc. per Kg. F.E.C. injected. | |
| Pressure 1–3′ after injection | 27 Mm. |
| Pressure 5′ after injection | 92 Mm. |
| Pressure 7′ after injection | 86 Mm. |

The foregoing work was completed about June 1, 1914. The following experiments were carried out during the spring of 1919.

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ISOLATED UTERUS EXPERIMENTS.

For the uterus experiments, fresh samples of commercial drug were extracted and made into fluidextracts by the N. F. method.

The isolated uterus is, in most cases, an extremely sensitive organ, easily influenced by the chemical nature of the solutions applied to it. Any considerable amount of acid, alcohol, or astringent principle in the solution applied is likely to impair the results of the experiment. Any substance to be applied to the structure should, therefore, be in a clear, neutral or nearly neutral, saline solution. Such a solution fully representing the fluidextract of cotton root bark seemed impossible, for any extensive change in the menstruum, such as would necessarily occur when the fluid was diluted in the Locke's solution surrounding the uterus, caused a precipitation of considerable extractive matter. Such a mixture, however, with its very fine, fresh precipitate, was considered preferable to a suspension of the powdered extract. The procedure employed was to dilute the fluidextract with 9 parts of saline solution, and of this 10% mixture, the doses for application were drawn off. These doses were further diluted from 50 to 100 times when introduced into the Locke's solution surrounding the uterus. The effect of any astringent matter in this dilute solution was disregarded. It would seem to be very slight if, in truth, any were exerted. According to the work of

*Table 7*

ISOLATED UTERUS EXPERIMENTS

*Guinea Pig's Uterus*

*Commercial Drug*

| Experiment or Kymo. | Drug | Dilution | Effect | (Contractions, etc.) |
|---|---|---|---|---|
| 1 | Pituitary Extract | 1:300,000 | 85 m.m | contraction |
| | Alcohol | 1: 1,333 | 21 " | " |
| | " | 1: 1,333 | 17 " | " |
| | Pituitary Extract | 1:300,000 | 67 " | " |
| 2 | Pituitary Extract | 1:300,000 | 87 " | " |
| | Alcohol | 1: 1,333 | 53 " | " |
| | " | 1: 1,333 | 45 " | " |
| | Pituitary Extract | 1:300,000 | 92 " | " |
| 3E* | Alcohol | 1: 1,333 | 19 m.m. | contraction |
| | F. E. Cotton R. B. (N. F.) | 1: 1,000 | 38 " | " |
| | Alcohol | 1: 1,333 | 20 " | " |
| | F. E. Cotton R. B. (N. F.) | 1: 1,000 | 48 " | " |
| | Alcohol | 1: 1,000 | 22 " | " |
| 4 | Pituitary Extract | 1:250,000 | 27 mm. | contraction |
| | Alcohol-glycerine, 3–1 | 1: 100 | Relaxation (slight) | |
| | " " | 1: 1,000 | No noticeable effect | |
| | F. E. Cotton R. B. (N. F.) | 1: 1,000 | " " | " |
| | F. E. Ergot | 1: 5,000 | 5 mm. | contraction |
| 5 | Pituitary Extract | 1:300,000 | 26 mm. | contraction |
| | Alcohol-glycerin, 3–1 | 1: 1,000 | No noticeable effect | |
| | F. E. Cotton R. B. (N. F.) | 1: 1,000 | 2 mm. | contraction |
| | F. E. Ergot | 1: 5,000 | 4 " | " |
| | F. E. Cotton R. B. (N. F.) | 1: 1,000 | No noticeable effect | |
| | F. E. Ergot | 1: 5,000 | 3.5 mm. | contraction |
| 6D | Pituitary Extract | 1:250,000 | 24 mm. | contraction |
| | " " | 1:250,000 | 21 " | " |
| | F. E. Cotton R. B. (N. F.) | 1: 1,000 | 1.5 " | " |
| | F. E. Ergot | 1: 4,000 | 24 " | " |
| 7C | Pituitary Extract | 1:250,000 | 87 mm. | contraction |
| | F. E. Cottou R. B. (N. F.) | 1: 1,000 | 14 " | " |
| | F. E. Ergot | 1: 10,000 | 70 " | " |
| 8B | Pituitary Extract | 1:200,000 | 33 mm. | contraction |
| | F. E. Cotton R. B. (N. F.) | 1: 500 | 9 " | " |
| | F. E. Ergot | 1: 5,000 | 24 " | " |
| 9 | Pituitary Extract | 1:300,000 | 107 mm. | contraction |
| | F. E. Cotton R. B. (N. F.) | 1: 500 | 55 " | " |
| 10G | F. E. Ergot | 1: 10,000 | 48 mm. | contraction |
| | F. E. Cotton R. B. (N. F.) | 1: 1,000 | 26 " | " |
| | F. E. Ergot | 1: 10,000 | 43 " | " |
| 11 | Pituitary Extract | 1:300,000 | 122 mm. | contraction |
| | F. E. Cotton R. B. (N. F.) | 1: 133 | 115 " | " |
| | Pituitary Extract | 1:300,000 | 123 " | " |
| 12F | Pituitary Extract | 1:250,000 | 30 mm. | contraction |
| | F. E. Cotton R. B. (N. F.) | 1: 1,000 | 6 " | " |
| | Pituitary Extract | 1:250,000 | 11 " | " |
| | F. E. Ergot | 1: 10,000 | 21 " | " |
| | Pituitary Extract | 1:250,000 | 73 " | " |
| | F. E. Cotton R. B. (N. F.) | 1: 1,000 | 6 " | " |
| | " | 1: 1,000 | 4 " | " |
| | F. E. Ergot | 1: 10,000 | 5 " | " |
| | " | 1: 10,000 | 5 " | " |
| | " | 1: 10,000 | 10 " | " |
| | " | 1: 10,000 | 31 " | " |
| | F. E. Cotton R. B. (N. F.) | 1: 1,000 | 22 " | " |

*Table 7*

ISOLATED UTERUS EXPERIMENTS

*Guinea Pig's Uterus*

*Commercial Drug*

| Experiment or Kymo. | Drug | Dilution | Effect | (Contractions, etc.) |
|---|---|---|---|---|
| 13 | Pituitary Extract | 1:300,000 | 52 mm. | contraction |
| | Alcohol | 1: 1,333 | 16 " | " |
| | " | 1: 1,000 | 13 " | " †H.T. |
| | " | 1: 1,333 | 10 " | " H.T. |
| | Pituitary Extract | 1:300,000 | 42 " | " H.T. |
| | F. E. Cotton R. B. (N. F.) | 1: 1,000 | 14 " | " L.T. |
| | " | 1: 1,000 | 13 " | " L.T. |
| | " | 1: 1,000 | 4 " | " L.T. |
| | Pituitary Extract | 1:300,000 | 6 " | " L.T. |
| | " " | 1:300,000 | 7 " | " L.T. |

†H. T. = Higher Tonus. L. T. = Lower Tonus.

| | | | | |
|---|---|---|---|---|
| 14 | Pituitary Extract | 1:250,000 | 14 mm. | contraction |
| | " " | 1:250,000 | 13.5 " | " |
| | Alcohol | 1: 1,333 | 0 " | " |
| | " | 1: 1,333 | 1 " | " |
| | " | 1: 1,333 | 1 " | " |
| | " | 1: 1.333 | 1 (?) " | " |
| | Pituitary Extract | 1:250,000 | 30 " | " |
| | " " | 1:240,000 | 32 " | " |
| | F. E. Cotton R. B. (N. F.) | 1: 1,000 | 5 " | " |
| | " | 1: 1,000 | 4 " | " |
| | " | 1: 1,000 | 2 " | " |
| | Pituitary Extract | 1:250,000 | 2.5 " | " |
| | " " | 1:250,000 | 4.5 " | " |
| 15A | Pituitary Extract | 1:250,000 | 65 mm. | contraction |
| | " " | 1:250,000 | 66 " | " |
| | F. E. Cotton R. B. (N. F.) | 1: 1,000 | 9 " | " |
| | Pituitary Extract | 1:300,000 | 42.4 " | " |
| | F. E. Ergot | 1: 5,000 | 70 " | " |
| | " | 1: 10,000 | 64 " | " |
| | F. E. Cotton R. B. (N. F.) | 1: 1,000 | 62 " | " |
| | " | 1: 1,000 | 40 " | " |
| | " | 1: 1,000 | 10 " | " |
| | F. E. Ergot | 1: 10,000 | 17.5 " | " |
| | " | 1: 10,000 | 38.5 " | " |
| | F. E. Cotton R. B. (N. F.) | 1: 1,000 | 30 " | " |

*The letters indicate the corresponding kymograms on Chart 2.

Power and Browning, cotton root bark contains no tannin.[3] The effect of the alcohol, however, was studied by applying percentages equal to and greater than that found in the solutions of cotton root bark.

Table 7 shows the results of fifteen experiments on the isolated guinea pig's uterus.

*Table 8* INTACT UTERUS EXPERIMENTS—CATS

| | | |
|---|---|---|
| Kymogram 904. | Cat Weight 2.38 Kg. | Acetoform anaesthesia. |
| .5 c.c. per animal | F. E. Cotton R. B. | =No contraction. |
| .5 c.c. " " | F. E. Ergot | =Marked contraction. |
| .5 c.c. " " | F. E. Cotton R. B. | =No contraction. |
| Kymogram 905. | Cat Weight 2.3 Kg. | Acetoform anaesthesia. |
| .2 c.c. per Kg. | F. E. Cotton R. B. | =Decided increase in tonus. |
| .2 c.c. " " | " | =Slight " " " |
| .2 c.c. " " | " | =Hardly noticeable effect. |
| .2 c.c. " " | F. E. Ergot | =Slight increase in tonus. |
| .2 c.c. " " | " | =" " " " |
| .2 c.c. " " | F. E. Cotton R. B. | =Very slight increase in tonus. |
| .2 c.c. " " | F. E. Ergot | =Slight increase in tonus. |
| .2 c.c. " " | Alc.-glyc. (3–1) | =No effect. |
| .4 c.c. " " | Pituitary Ext. | =Slight increase in tonus. |
| Kymogram 903. | Cat Weight 2.8 Kg. | Morph. S.-acetoform anaesthesia. |
| .5 c.c. per animal | F. E. Ergot | =No contraction. |
| .005 g. | Ergotoxine Phosphate | =Increased tonus. |
| 1 c.c. | Pituitary Extract | =" " |
| 1 c.c. | F. E. Cotton R. B. | =No effects. |
| Kymogram 909. | Cat Weight 3.05 Kg. | Morph. S.-acetoform anaesthesia. |
| .5 c.c. per animal | F. E. Ergot | =No contraction of uterus. |
| .5 c.c. " " | " | =Distinct contraction. |
| .5 c.c. " " | " | (While uterus was slightly contracted.) =Relaxation and then contraction. |
| .5 c.c. " " | F. E. C. R. B. | =Relaxation. |
| .2 c.c. " " | Pituitary Ext. | =Distinct contraction. |
| Kymogram 907. | Cat Weight 2.6 Kg. | Morph. S.-acetoform anaesthesia. |
| .5 c.c. per animal | F. E. Ergot | =Marked contraction of uterus. |
| .5 c.c. " " | F. E. C. R. B. | =" " " " |
| .5 c.c. " " | " | =" " " " |
| .5 c.c. " " | " | =" " " " |

*Table 9* INTACT UTERIUS EXPERIMENTS—RABBITS

| | | | |
|---|---|---|---|
| Kymogram M-3987-A. | Weight of rabbit 2.2 Kg. | Pregnant. | Paraldehyde. |
| .2 c.c. p. Kg. | F. E. C. R. B. (50% Alc.) | 35 mm. contraction of uterus. | |
| .2 c.c. p. Kg. | F. E. C. R. B. (75% Alc.) | 28 mm. " " " | |
| .05 c.c. p. Kg. | F. E. Ergot (50% Alc.) | 50 mm. " " " | |
| Kymogram 3987. | Weight 2 Kg. | Non-pregnant, multiparous. | Paraldehyde. |
| .2 c.c. p. Kg. | F. E. C. R. B. (50% Alc.) | No effect. | |
| .4 c.c. p. Kg. | F. E. C. R. B. (75% Alc.) | No effect. | |
| .1 c.c. p. Kg. | F. E. Ergot (50% Alc.) | 4 mm. contraction. | |
| Kymogram 3989. | Weight 2.2 Kg. | Non-preganant, multiparous. | Paraldehyde. |
| .4 c.c. p. Kg. | F. E. C. R. B. (75% Alc.) | 12 mm. contraction. | |
| .2 c.c. p. Kg. | F. E. Ergot (50% Alc.) | 11 mm. " | |
| .2 c.c. p. Kg. | 1:1,000 Pituitary Ext. | 12 mm. " | |
| Kymogram 3990. | Weight 2.3 Kg. | Non-pregnant, multiparous. | Paraldehyde. |
| .4 c.c. p. Kg. | F. E. C. R. B. (75% Alc.) | No effect. | |
| .2 c.c. p. Kg. | F. E. Ergot (50% Alc.) | 7 mm. contraction. | |
| Kymogram 4204. | Weight 1.56 Kg. | Virgin. | Paraldehyde. |
| .2 c.c. p. Kg. | F. E. Ergot (50% Alc.) | Many contr's. | One = 47 mm. |
| .4 c.c. p. Kg. | F. E. C. R. B. (75% Alc.) | Wave-like contr's. | One = 2.5 mm. |
| .8 c.c. p. Kg. | " " " | " " | One = 1 mm. |
| .2 c.c. p. Kg. | F. E. Ergot (50% Alc.) | Series of contr's. | One = 37.5 mm. |
| Kymogram 4205. | Weight 1.66 Kg. | Virgin. | Paraldehyde. |
| .4 c.c. p. Kg. | F. E. C. R. B. (75% Alc.) | Tone increased 11 mm. Increased contractions. | |
| .6 c.c. p. Kg. | " " " | Wave-like contractions = 5 mm. | |
| .2 c.c. p. Kg. | F. E. Ergot (50% Alc.) | Series of contr's. | One = 18.5 mm. |
| .1 c.c. p. Kg. | " " " | " " " | One = 23.5 mm |

### INTACT UTERUS EXPERIMENTS.

**The intact uterus experiments were carried out on both cats and rabbits. Nothing was known regarding the previous condition of the cats. For the experiments, they were anaesthetized with acetoform. The rabbits were anaesthetized with paraldehyde. Those which had had young, had previously been used for certain biological tests. The virgins were young animals which were raised at the laboratory. Tables 8 and 9 give the results recorded in these experiments.**

### SUMMARY AND CONCLUSIONS.

*Cock's Comb Method.*—Cotton root bark in large doses produced very slight bluing of the cock's comb in a few cases. Doses of the fluidextract fully four times as large as those required of fluidextract of ergot to produce a distinct bluing, failed to produce a comparable effect. Other systemic effects such as dyspnoea and diarrhoea were very pronounced. Owing to these severe symptoms produced by the cotton root bark in the necessarily large doses, and to the unsatisfactory effect on the comb, a close comparison could not be drawn between the activity of this drug and ergot.

By this method, no decided difference could be detected between any of the samples tested, which included root bark from thirteen different varieties of the cotton plant collected at flowering, and several samples of commercial drug both "green" and "dried."

*Blood Pressure Method.*—Cotton root bark produced a slight but transient pressor effect on the blood pressure of the dog. The extent of the effect and the duration were not comparable to that produced by very much smaller doses of ergot. The effect of the cotton root bark usually passed off in 5 or 10 minutes, and occasionally this period was followed by one of lowered pressure. Succeeding doses produced less and less effect. Similarly, ergot following one or more doses of cotton root bark, even though the pressure had not been more than slightly elevated, seemingly did not cause its usual effect.

Five kymograms taken on the intact cat showed either a fall or no effect on the pressure.

On the cat spinal preparation, cotton root bark caused a fall in pressure. One record on a dog spinal preparation showed a slight but very brief rise followed by a fall below normal.

On these preparations, ergot produced a fairly well maintained rise.

By this method, no appreciable or striking difference was noticeable between any of the cotton root products tested.

*Isolated Uterus Method.*—Fluidextract of cotton root bark in rather large doses produced contractions of the isolated, guinea pig uterus. A very conservative interpretation of the results obtained would seem to be that cotton root bark possesses decidedly less than $^1/_{10}$ as much activity as ergot, and decidedly less than $^1/_{30}$ as much activity as commercial pituitary extract. In fact, when given in doses corresponding to these figures, the contractions produced by the cotton root bark were not comparable to those produced by the other substances. Successive doses of cotton root bark produced smaller and smaller contractions. Similarly, ergot and pituitary extract seemingly did not exert their usual effect after one or more doses of cotton root bark. The opposite effect was often observed when any of the three substances was given after ergot or pituitary extract.

By this method, only commercial samples of cotton root bark were tested. No decided difference could be noted between any of these from the results obtained.

Alcohol in a dilution of 1 : 1333, approximately the percentage possessed by a 1 : 1000 dilution of fluidextract of cotton root bark which in several instances was found to be active, caused contractions of the isolated uterus. A 1 : 100 dilution of alcohol caused, in one instance, an inhibition.

*Intact Uterus Method.*—The results obtained on the intact uterus show that cotton root bark possesses a slight action on the uterus of both the cat and the rabbit. The results on the virgin rabbit's uterus were the most satisfactory. These results indicate that the action of cotton root bark is not comparable to that possessed by ergot. As under the other methods, successive doses of cotton root bark seem to produce less and less effect, and ergot given after cotton root bark seems to produce less than its usual effect.

By this method only commercial samples of cotton root bark were tested. No decided difference could be noted between any of these from the results obtained.

## RECAPITULATION.

Samples of the root bark from thirteen different varieties of the cotton plant, collected at flowering, and a number of samples of commercial root bark, both "green" and "dried," were tested for activity by methods commonly employed for the assay of ergot, namely, the cock's comb, blood pressure, and uterus methods.

Large doses produced a very slight bluing of the cock's comb in

a few cases. In general the results by this method were rather indefinite and unsatisfactory, and no decided difference could be detected between any of the samples tested.

A very slight and transient pressor effect was produced on the blood pressure of the dog. On the intact cat a depressor effect or no effect at all was observed. On the cat spinal preparation a depressor effect was observed, and on a dog spinal preparation a pressor followed by depressor. By this method no decided difference could be noticed between any of the samples tested.

Rather large doses produced small contractions of the isolated guinea pig uterus and the uterus of the cat and rabbit in situ. By the uterus methods only samples of commercial drug were tested. No decided difference could be noticed between any of these from the results obtained.

By the four methods employed, the activity shown by cotton root bark was not comparable to that possessed by ergot.

Tables of results and charts of tracings are given.

I wish to express my obligations to Dr. A. L. Walters under whose supervision this work was carried out.

Credit is due Mr. C. E. Lawson, for preparing the thirteen experimental samples, and Mr. C. C. Hargreaves and Mr. E. E. Swanson for assistance in carrying out the experiments.

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## THE MACHINERY FOR THE U. S. P. IX REVISION.*

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### GENERAL COMMITTEE OF REVISION.

The General Committee of Revision, consisting of 51 members, one of whom was the President of the Convention, ex-officio, having been elected by the Pharmacopœial Convention of 1910, the com-

*Read before the Philadelphia Branch of the American Chemical Association.

mittee proceeded to elect its chairman, but largely left in his hands the details of organization.

There was to be an Executive Committee of fifteen members to be elected from the General Committee and presided over by the chairman of the General Committee, and it was understood that there would be sub-committees.

Professor Remington, the elected chairman, fortunately had experience in revision work covering at least four decades, and qualified by his natural organizing ability, was able to create a machine which worked harmoniously and effectively. With the approval of the Committee and Board, the following general plan of organization was carried out:

*Sub-Committee.*—Each member of the General Committee was invited to express his preference for the type of revision work which he would care to assume, the list of sub-committees having been decided upon at the first meeting of the committee in Washington. These sub-divisions consisted of:

1 Scope.
2 Therapeutics, Pharmacodynamics and Posology.
3 Biological Products, Diagnostical Tests.
4 Botany and Pharmacognosy.
5 General and Inorganic Chemistry.
6 Organic Chemistry.
7 Proximate Assays.
8 Volatile Oils.
9 Fluid and Solid Extracts, Tinctures.
10 Aromatic Waters, Spirits, Liquors.
11 Syrups and Elixirs.
12 Cerates and Ointments.
13 Miscellaneous Galenicals.
14 Tables, Weights, Measures.
15 Nomenclature.

From these preferences, the chairman of the General Committee appointed sub-committee members. Naturally, the botanists indicated their preference for that type of work; chemists selected chemical subjects; the physicians, scope, therapeutics and related subjects; while the pharmacists were especially interested in pharmaceutical preparations. These assignments by one who was personally acquainted with practically every member of the committee, proved

generally acceptable and satisfactory. The appointments, however, according to the by-laws, were confirmed by the General Committee and Board of Trustees. Each sub-committee then proceeded to elect its chairman, the election being finally approved by the General Committee and Board of Trustees.

*Executive Committee.*—By common consent, it was then decided that the chairman of sub-committees would constitute the Executive Committee, the general chairman presiding according to the by-laws. This plan has been very effective, as the Executive Committe has thus consisted of representatives from every sub-committee and naturally, being chairman, they were all active workers.

*Method of Revision.*—The following plan of procedure was then adopted: The Sub-committee on Scope decided very promptly upon the majority of the substances to enter the new Pharmacopœia. This list, over which there was no difference of opinion, was immediately placed in the hands of the other sub-committees for their consideration, while the Sub-committee on Scope proceeded with the further consideration of drugs, chemicals and preparations, over which there was some question concerning admission. As these were decided they were reported to the Executive Committee, with the vote in the Sub-committee on Scope and finally, if admitted, referred to the proper Sub-committee for revision. As a preparation, drug or chemical, or possibly a process, was referred to a sub-committee, the chairman was given entire liberty of action and two different methods were in general use, depending upon the preference of the presiding officer. In one instance, the chairman compiled all available data on each subject, and submitted it to his sub-committee for their consideration and comment. Having completed this step, and any necessary experiments or tests, he then prepared a tentative text, embodying the desired changes, as indicated by his own experience and experiments, and the recommendations of members of his sub-committee. The text was then submitted to the sub-committee and again subject to their criticism. When finally satisfactory to the sub-committee, the revised text was sent to the chairman of the Executive Committee who modified the wording, if necessary, to bring it into harmony with the editorial style decided for the new book, and then submitted it to the Executive Committee for their comment.

The other plan used by some sub-committee chairmen was to

assign the subjects submitted for revision, to individual members and ask that reports be made promptly to the chairman of the sub-committee, embodying the proposals for a revised text. These reports were in turn submitted to the entire sub-committee by the sub-committee chairman and when finally approved, placed before the Executive Committee. The general chairman now compiled all comments and discussions, submitted by the members of the Executive Committee and these were published before the entire Executive Committee, and copies sent to the members of the sub-committee which had submitted the original report.

When practically all of the articles submitted to a sub-committee had been reported upon, in most instances arrangements were made for the members of the sub-committee to hold a personal conference, when all suggestions or adverse criticisms were considered, and a report drawn up for submission to the General Committee. At this time, the chairman of the General Committee again carefully revised the copy from an editorial standpoint, and submitted it in full, as proposed for inclusion in the new Pharmacopœia, to all members of the General Committee.

It must not be thought that the General Committee had no part in the revision up to this time. Many subjects of general interest, and policies and principles of the revision had been placed before the General Committee and the work proceeded, all comments received from many sources and as submitted to the convention, had been published in the general committee circulars. Another feature, which proved of great value was the placing of monthly "reports on progress" from every sub-committee, before the General Committee. This feature of the revision work was not generally known, but the general chairman sent a request to every sub-committee chairman, about ten days before the end of each month, asking him to fill out an enclosed blank. This blank covered all likely activities of the sub-committee during the month, and these were compiled and submitted regularly to the General Committee as already indicated. This plan increased activity in the sub-committees and at the same time kept the General Committee familiar with all parts of the work. As the revision work is largely voluntary, it was found desirable to use this publicity method, within the committee, to stimulate progress.

At the same time that this material was submitted to the General Committee, abstracts of proposed changes were prepared and pub-

lished in the *Journal of the American Pharmaceutical Association*, and reprints very generally distributed, so that the country could see what changes were proposed in advance of the actual publication of the book. In the experience of the last committee, it was shown that any extensive publicity of proposed changes prior to this point, would be premature. During the actual discussion on revision, the work would be prolonged beyond all reasonable time if the public were admitted to the preliminary committee conferences, and discussions are more free and valuable if kept within the sub-committees. The experience of the last Revision Committee has shown that publication at this stage of the revision gives ample time for those who are not on the committee to give valuable criticism or recommendations and this feature should remain a part of any revision scheme.

*Preparing the Manuscript.*—Ample time having been allowed for comments from the committee and also from those who were interested in Pharmacopœial revision, who were not members of the committee, but had access to the public abstracts, these were assembled on sheets containing the latest copy of the proposed text, as submitted to the General Committee, and were given detailed consideration by the chairman, in conference with the different sub-committee chairmen. Those which were found of vital importance and sufficiently tested, were embodied in the text. The manuscript was now made up—every title, the construction of sentences, capitalization, punctuation, and other editorial detail being given a final polishing, and the manuscript sent to the printer.

Of course, before this time, sample pages to show styles of type and general arrangement, had been approved. The galley proofs were submitted on standard size paper ($8^1/_2 \times 11$) perforated for binding, and were clean impressions taken from a press, so that they were perfectly legible. The galley was now sent to every member of the Executive Committee, in duplicate, and as the galleys were returned by the members to the general chairman, the comments were assembled in the chairman's office upon one set of galleys. These comments were once more given consideration in conference with the sub-committee chairman, and corrected copy for page proof returned to the printer. Page proof in duplicate was now submitted to every member of the General Committee, and the returned comments from the General Committee once more assembled

on one set of page proof, and from this material the copy for foundry proof was prepared. The general chairman finally passed upon the foundry and plate proofs and printing was ordered. Two thousand copies were in the first printing, and these were sent to the journals for review, to all members of the Committee of Revision, and a few were sold. A few typographical errors were discovered by this critical review of the finished book and these were all corrected in the plates before the first large edition of 10,000 copies was printed, so that the main edition, from the very start of the printing, was free from the majority of the errors which have been only recently announced.

As a result of the experience in the revision of the U. S. P. IX there is one outstanding feature which would seem to lend itself to broader application in the next revision, namely, an increased number of personal conferences. While it is true that the next revision of the Pharmacopœia does not seem to call for as extensive alteration, in either style or fact, as heretofore, and therefore will naturally require much less time for revision than the U. S. P. IX, yet the correspondence method is so cumbersome and time-consuming, that the conference plan for getting results would greatly lessen the necessary time of revision. As an illustration of the time necessary for the correspondence method, with the committee scattered over a large part of the United States, and the time for an exchange of mail being at least five days in some instances, the following general plan had to be followed in voting:

The subject for consideration was presented to the committee by the general chairman, with a statement of the proposal and any necessary explanations or comments for the members. Two weeks was allowed for assembling all discussions. At the end of two weeks, a voting sheet was mailed to each member with all the comments on the proposition. Two weeks was again allowed for the return of the voting sheets before the result of the vote was announced, thus four weeks was the minimum time required for a vote. As frequently happened, a member would submit an amendment, which required another two or four weeks for final settlement. Thus it will be seen that the hundreds of problems before the committee involve an extended time for final agreement.

It is therefore suggested that when the General Committee of Revision of the U. S. P. IX submits its recommendations to the convention for procedure in the new revision, that they advise the new

General Committee to meet for at least one day following the convention, elect a chairman, sub-committees, and sub-committee chairmen and dispose of a few of the more important questions of policy before adjourning.

There should then be arranged a personal conference for each sub-committee as soon as they have enough material before them for arriving at decisions which would probably be about six months after their organization. The most important modification to increase efficiency and lessen the time of revision, however, would be a personal conference of the Executive Committee, at least once in each two months during the active work of revision. In the interim, the general chairman could place many problems before the committee, with discussions, and a program for a conference at an agreed time, when most of the questions under consideration could be decided in a one-day meeting. Full stenographic details of the conferences should be presented to each member immediately after the meeting and the decks being cleared by the conference, new work could be considered in preparation for the next meeting. It is believed that if the Executive Committee again consists of the sub-committee chairmen, that these personal conferences will tremendously stimulate the work of the sub-committees, as each chairman will be expected to report in full the condition of his own sub-committee at each of these conferences. This of course, will necessitate a personal sacrifice of the time on the part of the members of the Executive Committee, but it is believed that this method will so greatly facilitate the work of revision, that it can be concentrated into the first year and everyone promptly relieved of the burden. Of course, railroad and hotel expenses of these conferences should be met by the convention.

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## CAFFEINE FROM COFFEE SOOT.*

SUGGESTION FOR RECLAIMING A PORTION OF THE CONSTITUENTS WHICH ARE VOLATILIZED IN THE ROASTING PROCESS.

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The soot which collects in the flues and on the upper inner surface of coffee roasters frequently contains enough caffeine to warrant its use as a raw material for the production of this valuable sub-

* From *The Tea and Coffee Trade Journal*, March, 1920.

stance. Since there is considerable demand for caffeine, the collection of coffee soot, if established upon a profitable basis, would result in an added source of income to coffee roasting firms.

In order to interest roasters in the collection of the "soot," a statement regarding the probable price which might be obtained for it is pertinent. No market price has been thoroughly established for this article, because it varies greatly in caffeine content. Specimens recently examined in the Pharmaceutical Research Laboratories of the H. K. Mulford Co., Philadelphia, ranged all the way from 0.08 to 22.2 per cent. in caffeine content.

SOME ANALYSES OF COFFEE SOOT.

| Sample No. | Caffeine Content. | Source of Sample.[1] |
|---|---|---|
| 1..... | 22.20% | Flue of roaster. |
| 2..... | 18.30% | Flue of roaster. |
| 3..... | 11.94% | Inner walls of roaster. |
| 4..... | 3.25% | Ceiling of roaster. |
| 5..... | 1.76% | Dust collector on roof (mixed with chaff). |
| 6..... | 0.70% | Flue of roaster. |
| 7..... | 4.18% | Flue of roaster. |
| 8..... | 1.20% | Flue of roaster. |
| 9..... | 7.10% | Flue of roaster. |
| 10..... | 11.20% | Flue of roaster. |
| 12..... | 0.08% | Flue of roaster. |
| 13..... | 4.42% | Ceiling of roasting room. |
| 14..... | 15.30% | Flue of roaster. |

Since tea fluff, tea siftings, and damaged tea, which contain from 1 to 5 per cent. of caffeine, are commonly used raw materials for the production of caffeine, it is evident that collections of coffee soot with similar caffeine contents would be excellent material for the production of caffeine and should command a price approximately equal to that of these tea materials. These tea materials were quoted around 10c. per lb. during December, 1919. It is encouraging to report here that one-half of the coffee soot samples which we have examined possessed caffeine contents which were well above the maximum content of the starting materials obtained from tea.

A statement regarding the probable amount of soot collectable from roasters in a given time would also be pertinent, but un-

[1] None of the commercial roasters from which these samples were obtained, were equipped with collectors for the express purpose of collecting the "soot," and only one (No. 5) was equipped with a dust collector.

fortunately this cannot be offered, for the reason that no commercial roaster equipped with a soot collector was met with in this investigation. Only a properly designed and properly operated soot collector will yield figures for this.

By coffee soot is meant the smoke-like vapor which arises from the roasting barrel during the roasting process. Coffee chaff, which is also a by-product of the roasting of coffee, also contains caffeine, but its economic use for the production of caffeine has not been rendered possible up to the present time. It contains much smaller proportions of caffeine than the raw materials from tea, and in addition contains considerable pyroligneous or tarry matter which makes the production of pure white caffeine very difficult and expensive. Specimens of coffee chaff recently examined in the Mulford laboratories ranged between 0.6 and 1.1 per cent. in caffein content.

## METHODS OF COLLECTING COFFEE SOOT.

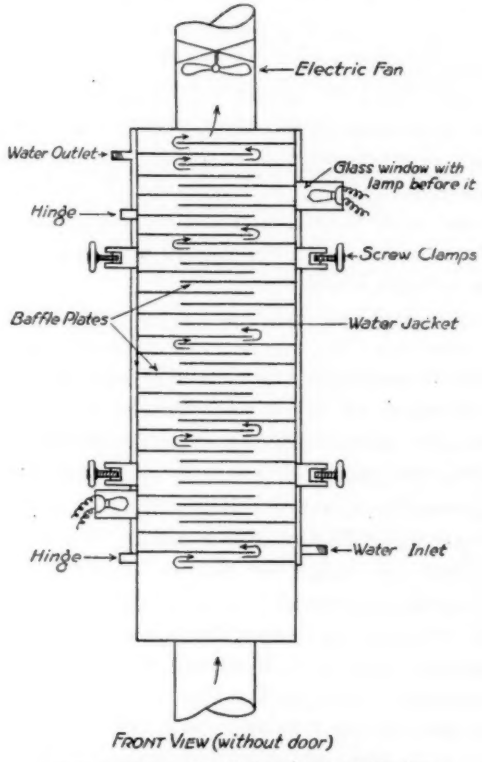
Caffeine is a sublimable substance, that is, it can be made to pass into the form of a vapor by heat; and upon cooling this vapor, the caffeine will be precipitated as a crystalline "snow." It is by the principle of sublimation that caffeine is collected; since the utilizable constituent of coffee soot and flue gases from the roasting of coffee is caffeine, it is by sublimation that the caffeine containing coffee soot is best collected.

Coffee soot escapes from the roaster *via* the flue. In practice, a considerable proportion also escapes into the room in which the roaster is situated, and where the collection of the soot is made a practice for profit, it is a source of loss of income. This loss can be prevented by proper regulation of the draft in the flue as described later in this article. Since coffee soot escapes *via* the flue, it is necessary, therefore, to connect the collector with the flue. Theoretically, the conditions required are a means of cooling the coffee soot and flue gases to precipitate the caffeine contained in them; a collector to retain the precipitated caffeine and soot; and a draught regulator to control the rate of flow of the soot and gases through the collector so that it is not so fast that caffeine passes through the collector and is lost in the outer air, nor so slow that the soot is lost by being forced out into the air of the room in which the roaster is situated.

The illustration herewith shows the details of a practical coffee soot collector.

DETAILS OF A COFFEE-SOOT COLLECTOR.

The collector consists of a water-jacketed, sheet-iron or cast-iron box equipped with baffle plates arranged so as to make a tortuous




Cross-section of a Coffee Soot Collector.

path for the soot from the coffee-roaster. It is connected in an upright position with the flue of the roaster.

If the resistance of the baffle plates is too great to permit the passage of the soot and flue gases, an electric fan must be installed in the exit pipe of the collector. The suction thus created must be just enough to prevent the soot and gases from coming out into the room in which the roaster is situated, and not enough to carry any of the chaff up into the collector.

The water jacket is required to be operated only in the summer, and may not be necessary at all in connection with smaller roasters.

The glass windows with incandescent lamps before them, in the sides of the collector, are required during the installation of the collector when the best conditions for operation are being established.

The door of the collector is attached very loosely so as to allow a final tight adjustment by means of the four screw clamps. A soot-tight joint is obtained by means of an asbestos or composition gasket fixed in a slot around the inner edge of the door.

The interior of the collector is painted with aluminum paint, to prevent rust from forming and becoming mixed with the soot.

The collected soot is removed by releasing the screw clamps, throwing back the door on its hinges and scraping out the soot with a long steel or wooden blade.

Only the soot, and not the chaff, possesses any degree of commercial value, therefore the collector will probably not be applicable to the collection of soot from the type of roaster in the flue of which a strong blower must be employed, for the reason that the chaff and soot are usually inseparably mixed by the blower. The collector can be applied to the collection of soot from a roaster equipped with a blower by reducing the speed of the blower, so that none of the chaff is blown up into the collector, the speed of the blower being only enough to prevent the escape of soot and flue gases into the room in which the roaster is situated. If the purpose of the blower is the removal of the chaff, reduction of its speed to collect the soot will nullify this purpose and add an operation to the roasting process, namely the removal of the chaff. This will increase the expense of coffee-roasting process, and should be debited against the returns to be expected from the collection of the soot.

### FOR EITHER GAS OR COAL ROASTERS.

The collector is applicable to the collection of coffee soot from either gas-fired or coal-fired roasters, but it must be remembered that coal soot or gas soot have no value, and therefore efforts must not be directed toward the production of these types of soot.

No dimensions are indicated in the drawing of the collector, as any size can be used according to requirements; merely keeping the dimensions in approximately the same ratio as they appear

in the drawing. For a single roaster, it is likely that a collector 6 feet in height will completely collect the soot.

To the writer's knowledge the collection of coffee soot is not being practiced in this country, but is in Continental European countries with reputed satisfactory returns. The Continental preference for more thoroughly roasted coffee may be a factor in this respect, because the soot would consequently be richer in caffeine. Whether coffee soot can be established as a profitable source of caffeine in this country is problematical and is a challenge to our best efforts.

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## THE STRUCTURE OF ATOMS AND ITS BEARING ON CHEMICAL VALENCE.*

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According to the well-established Rutherford-Bohr theory, all the positive electricity in an atom is concentrated in a *nucleus* at its center. The dimensions of this nucleus are negligibly small compared with those of the rest of the atom, its diameter being of the order of 0.00001 of that of the atom. The charge on the nucleus is an integral multiple of the charge of an electron but, of course, opposite in sign. The remainder of ths atom consists of electrons arranged in space about the nucleus, the normal number of such electrons (called the *atomic number*) being equal to the number of unit positive charges on the nucleus, so that the atom as a whole is electrically neutral. If the number of electrons in the atom exceeds the atomic number we have a negatively charged atom or ion, while in the reverse case a positively charged atom or ion results. The atomic number of any element has been found to be equal to the ordinal number of the element in the periodic table. Thus hydrogen has the atomic number 1, helium 2, lithium 3, carbon 6, neon 10, chlorine 17, nickel 28, silver 47, cerium 58, tungsten 74, radium 88, and uranium 92 The atomic numbers can be determined experimentally from the X-ray spectrum so that we are not dependent upon the periodic table for our knowledge of these numbers.

* From *The Jour. of Indus. and Engineering Chem.*, April, 1920.

Bohr, Sommerfeld, and others have developed an extensive and very successful theory of spectra upon the hypothesis that the electrons in atoms are in rapid rotation in plane orbits about the nucleus in much the same way as the planets revolve around the sun. Stark, Parson, and G. N. Lewis, on the other hand, starting from chemical evidence, have assumed that the electrons are stationary in position. It should be noted that Bohr's theory has had its greatest success when applied to atoms or ions containing only one electron and that it seems incapable of explaining the chemical or ordinary physical properties of even such simple elements as lithium, carbon, or neon.

The two theories can, however, be reconciled if we consider that the electrons, as a result of forces which they exert on one another, rotate about certain definite positions in the atom which are distributed symmetrically in three dimensions. Thus for atoms containing only a single electron the chemical theory is in agreement with Bohr's theory. But for an atom such as neon the eight electrons in the outside layer would revolve around positions which are located about the nucleus in the same way that the eight corners of a cube are arranged about the center of the cube. This structure is not inconsistent with those parts of Bohr's theory which have received experimental confirmation. In fact, Born and Landé,[1] starting with Bohr's theory and without knowledge of Lewis' work, arrived at exactly this conception of the structure of atoms (*i. e.*, the cubic atom) from a study of the compressibility of the salts of the alkali metals.

The atomic numbers and the properties of the inert gases furnish us with a clue to the arrangement of the electrons within atoms. The low boiling point, the high ionizing potential, the chemical inertness, etc., of helium prove that the arrangement of the electrons in the helium atom is more stable than that in any other atom. Since this atom contains two electrons we must conclude that a pair of electrons in the presence of a nucleus represents a very stable group. It is reasonable that with elements of higher atomic numbers there should be an even greater tendency for this stable pair of electrons to form about the nucleus. There are two sets of facts which furnish conclusive experimental evidence that this stable pair exists in all atoms above helium.

[1] *Verh. d. phys. Ges.*, 20: 210, 1918.

In the first place, the properties of lithium, beryllium, etc., show that in these elements also the first two electrons are held firmly while the remainder are easily detached. Thus, lithium readily forms a univalent positive ion by the detachment of one of the three electrons in its neutral atom. The divalence and other properties of beryllium prove that there is little or no tendency for a second stable pair of electrons to surround the first pair.

In the second place, the absence of irregularities in the observed K and $L_I$ series of the X-ray spectra of the various elements proves that there are no sudden changes in the number of electrons in the innermost layers of electrons about the nucleus. From these two sets of facts, as well as from other evidence, we may take it as a fundamental principle that the arrangement of the inner electrons undergo no change as we pass from elements of smaller to those of higher atomic number.

The properties of neon indicate that its atoms are more stable than those of any other element except helium. Since the atomic number is 10, and the first 2 electrons form a stable pair about the nucleus as in the helium atom, it follows directly that the other eight electrons arrange themselves in a second layer or shell possessing a very high stability. If these 8 electrons revolved about the nucleus in a single circular orbit or ring, as would be suggested by Bohr's theory, there is no apparent reason why there should by any very great difference in stability between rings having 7, 8 or 9 electrons. On the other hand, we readily see that the geometrical symmetry of the arrangement of the 8 electrons at (or rotating about) the 8 corners of a cube would not only account for a high degree of stability but for the fact that an arrangement of 7 or 9 electrons would have no such stability. Chemical considerations and Born and Landé's work on compressibility also lead us to this spatial arrangement of the electrons. We shall refer to the stable group of 8 electrons by the term *octet*. From the principles already enunciated it is clear that in the atoms of all the elements above neon the inner electrons are arranged in the same way as those of neon.

From the atomic numbers of the inert gases we are thus able to determine the number of electrons in the various layers or shells of electrons which exist in the atoms. The results are summarized in Table 1.

Thus the xenon atom with an atomic number 54 contains 54 electrons arranged as follows: Close to the nucleus are two elec-

TABLE I—DISTRIBUTION OF ELECTRON IN THE VARIOUS SHELLS.

| Shell. | Number of Electrons. | Inert Gas Corresponding to Completed Layer. |
|---|---|---|
| 1st shell | $2 = 2 \times 1^2$ | He 2 |
| 2nd shell, 1st layer | $8 = 2 \times 2^2$ | Ne 10 |
| 2nd shell, 2nd layer | $8 = 2 \times 2^2$ | Ar 18 |
| 3rd shell, 1st layer | $18 = 2 \times 3^2$ | Kr 36 |
| 3rd shell, 2nd layer | $18 = 2 \times 3^2$ | Xe 54 |
| 4th shell, 1st layer | $32 = 2 \times 4^2$ | Nt 86 |

trons which constitute the first shell. This is surrounded by the second shell which contains two "layers" of 8 electrons each. The third shell, which in the xenon atom is the outside shell, contains 18 electrons.

An examination of the numbers of electrons in the layers (Table 1, 2nd column) shows that they bear a simple mathematical relation to each other, namely, that they are proportional to the squares of the successive integers 1, 2, 3 and 4. This is to be looked upon as perhaps the most fundamental fact underlying the periodic arrangement of the elements. It is significant that in Bohr's theory these same numbers, 1, 4, 9, 16, etc., play a prominent part. Thus the energies of the electron in the various "stationary states" are proportional to 1, $^1/_4$, $^1/_9$, $^1/_{16}$, etc., and the diameters of the various possible orbits in Bohr's theory are proportional to 1, 4, 9, 16, etc. In Bohr's theory the various stationary states correspond to different number of quanta (Planck's quantum theory), the innermost orbit corresponding to one quantum, the second orbit to two quanta, etc. We should thus consider (Table 1) that the electrons in the 1st shell are monoquantic, those in both layers of the 2nd shell are diquantic, etc. It is interesting that Born and Landé, from quite other evidence, have concluded that the outermost electrons of the chlorine atom (2nd layer of the 2nd shell) are diquantic instead of triquantic, as was at first assumed.

The foregoing theory of the arrangement of electrons in atoms explains the general features of the entire periodic system of the elements and is particularly successful in accounting for the position and the properties of the so-called 8th group and the rare earth elements. It also serves to correlate the magnetic properties of the elements.

Let us now consider the bearing of this theory of atomic structure on the phenomena of chemical valence. The outstanding fea-

ture of the theory is that there are certain groups of electrons, such as the pair in the first shell and the octet in the second, that have a remarkable stability. Those atoms in which all the electrons form parts of such stable groups (*viz.*, the inert gases) will have no tendency to change the arrangement of their electrons and will thus not undergo chemical change. Suppose, however, we bring together an atom of fluorine (N = 9)[1] and an atom of sodium (N = 11). Ten electrons are needed for the stable pair in the first shell and the octet in the second shell, as in the neon atom. The sodium atom has one more electron than is needed to give this stable structure while the fluorine atom has one electron too few. It is obvious then that the extra electron of the sodium atom should pass over *completely* to the fluorine atom. This leaves the sodium atom with a single positive charge while the fluorine becomes negatively charged. If the two charged atoms or ions[2] were alone in space they would be drawn together by the electrostatic force and would move as a unit and thus constitute a molecule. However, if other sodium and fluorine ions are brought into contact with the "molecule" they will be attracted as well as the first one was. There will result (at not too high temperature) a space lattice consisting of alternate positive and negative ions and the "molecule" of sodium fluoride will have disappeared. Now this is just the structure which we find experimentally for sodium fluoride by Bragg's method of X-ray crystal analysis. There are no bonds linking individual pairs of atoms together. The salt is an electrolytic conductor only in so far as its ions are free to move. In the molten condition or when dissolved in water, therefore, it becomes a good conductor.

The case of magnesium (N = 12) and oxygen (N = 8) is similar except that two electrons are transferred from the magnesium to the oxygen atom. The resulting ions have their electrons arranged exactly like those of the neon atoms and the ions of sodium

[1] We will denote the atomic number of an element by N.

[2] It is convenient and it has been customary with many physicists to speak of a charged atom or molecule as an ion, irrespective of whether or not the particle is able to wander under the influence of an electric field. The writer has used the term in this way in his recent publications. This practice is very distasteful to many physical chemists and is apt to be misunderstood by them. Nevertheless, it seems to me probable, especially in view of the recent work of Milner and Ghosh, that it will be desirable to abandon the physical chemists' definition of the ion and to apply it to all charged atoms or molecules. The ion which wanders may then be referred to as a "free ion."

and fluorine. Therefore, the crystalline form of magnesium oxide and sodium fluoride should be identical, and this prediction of the theory has been confirmed experimentally by Dr. A. W. Hull by the X-ray method. Because of the much greater forces acting between the ions as a result of the double charges, the stability of the magnesium oxide is much higher than that of the sodium fluoride. This is manifested by the high melting point, low conductivity, low solubility, and hardness of magnesium oxide.

Phosphorus (N = 15) and sulphur (N = 16) have, respectively, 5 and 6 electrons more than neon, and are thus capable of giving up these numbers of electrons. If these elements are brought into contact with an excess of fluorine (which because of its proximity to neon has a particularly strong tendency to take electrons) all the extra electrons pass to fluorine atoms. Thus a sulphur atom will supply electrons to 6 fluorine atoms and will form the compound $SF_6$. The force acting between the fluorine ions and the central sulphur ion is still electrostatic in nature it must be nearly 6 times greater than the force between sodium and fluorine ions. Furthermore, the 6 fluorine ions would surround the sulphur ion so that there would be little stray field of force. Therefore, we should not expect sulphur fluoride to be salt-like in character but to consist of very stable molecules having weak external fields of force and, therefore, readily existing in the form of a gas. As a matter of fact, this extraordinary substance has these properties developed to such a degree that it is an *odorless* and *tasteless* gas with a boiling point of —62 deg. Phosphorus pentafluoride, as would be expected from its less symmetrical structure, is a gas having greater chemical activity.

The fluosilicate ion $SiF_6^{--}$ has a structure exactly like that of the sulphur fluoride molecule, since the number and arrangement of the electrons are the same. This is clear if we consider that the atomic number of silicon is 14 while that of sulphur is 16. Thus if we should replace the nucleus of the sulphur atom in a molecule of sulphur fluoride by the nucleus of a silicon atom, without disturbing any of the surrounding electrons, we would have removed two positive charges and would obtain a negative ion with two negative charges of the formula $SiF_6^{--}$. In the presence of potassium ions we would then have the familiar salt potassium fluosilicate. The theory is thus capable of explaining typical complex salts. In fact, it is applicable to the whole field of inorganic compounds

covered by the work of Werner, and helps to simplify the theory of such compounds. There is no time, however, to go into this subject.

The simple theory of atomic structure which we have discussed thus far explains perfectly what has usually been called "the maximum positive and negative valence." The maximum positive valence represents the number of electrons which the atom possesses in excess of the number needed to form one of the particularly stable configurations of electrons. On the other hand, the maximum negative valence is the number of electrons which the atom must take up in order to reach one of these stable configurations.

For example, magnesium has a positive valence of two, since its atomic number is 12, while that of neon is 10. Sulphur has a positive valence of 6, since it has 6 electrons more than neon; but it has a negative valence of two because it must take up more electrons before it can assume a form like that of the argon atom.

It is clear, however, that this theory of valence is not yet complete.[1] It is not applicable to those cases where we have usually taken valences of 4 for sulphur, or 3 and 5 for chlorine, etc. But more especially it does not explain the structure of organic compounds and such substances as $H_2$, $Cl_2$, $O_2$, $N_2H_4$, $PCl_3$, etc.

J. J. Thomson, Stark, Bohr, and others had suggested that a pair of electrons held in common by two adjacent atoms may function in some cases as chemical bonds between the atoms, but this idea had not been combined with the conception of the stable groups of electrons or octets. G. N. Lewis, in an important paper in 1916, advanced the idea that the stable configurations of electrons in atom could share *pairs* of electrons with each other and he identified these pairs of electrons with the chemical bond of organic chemistry. This work of Lewis has been the basis and the inspiration of my work on valence and atomic structure.

As a result of the sharing of electrons between octets, the number of octets that can be formed from a given number of electrons is increased. For example, two fluorine atoms, each having seven electrons in its outside shell, would not be able to form octets at all except by sharing electrons. By sharing a single pair of electrons, however, two octets holding a pair in common required only 14

[1] The theories of Kossel, Lacomblé, Teudt, etc., which have recently been proposed in Germany, have not advanced beyond this point and are therefore very unsatisfactory as a general theory of valence.

electrons. This is clear if we consider two cubes with electrons at each of the eight corners. When the cubes are placed so that an edge of one is in contact with an edge of the other a single pair of electrons at the ends of the common edge will take the place of four electrons in the original cubes. For each pair of electrons held in common between two octets there is a decrease of two in the total number of electrons needed to form the octets.

Let $e$ represent the number of electrons in the outside shell of the atoms that combine to form a molecule. Let $n$ be the number of octets that are formed from these $e$ electrons, and let $p$ be the number of pairs of electrons which the octets share with one another. Since every pair of electrons thus shared reduces by two the number of electrons required to form the molecules it follows that $e = 8n - 2p$ or $p = {}^1/_2(8n - e)$.

This simple equation tells us in each case how many pairs of electrons or chemical bonds must exist in any given molecule *between the octets formed.* Hydrogen nuclei, however, may attach themselves to pairs of electrons in the octets which are not already shared. For example, in the formation of hydrogen fluoride from a hydrogen atom and a fluorine atom there are 8 electrons in the shells (e = 8). We place $n - 1$ in the above equation and find $p = 0$. In other words, the fluorine atoms do not share electrons with each other. The hydrogen nucleus having given up its electron to the fluorine atoms attaches itself to one of the pairs of electrons of the fluorine octet, and thus forms a molecule having a relatively weak external field of force. As a result, hydrogen fluoride is a liquid of low boiling point instead of being salt-like in character.

The equation given above is applicable to all types of compounds. For example, if we apply it to substances such as sodium fluoride, sulphur fluoride, or potassium fluosilicate, which were previously considered, we find in each case $p = 0$. In other words, there are no pairs of electrons holding the atoms of these compounds together. On the other hand, if we consider the compound $N_2H_4$, we find $p = 1$. Since there are only two octets, the pair of electrons must be between the two nitrogen atoms while the hydrogen nuclei attach themselves to pairs of electrons of the nitrogen octet. It can be readily shown that this simple theory is in fact identical with the accepted valence theory of organic chemistry and leads to the same structural formulas as the ordinary theory in all those

cases where we can take the valence of nitrogen to be 3, oxygen and sulphur 2, chlorine and hydrogen 1. In other cases, such as those where quinquivalent nitrogen has been assumed, the new theory gives results different from the old, but in each case in better agreement with the facts.

The theory indicates a series of new relationships between certain types of substances which I have termed *isosteric* substances. For example, it indicates that the molecules of carbon dioxide and nitrous oxide should have nearly identical structures and this is borne out by the extraordinary similarity in the physical properties of these gases. Nitrogen and carbon monoxide constitute another pair of gases which are similarly related. The same theory also points out a number of previously unsuspected cases of similarity of crystalline form (isomorphism).

It is clear that in the past the term valence has been used to cover what we may now recognize as three different types of valence, as follows:

1. Positive valence: the number of electrons an atom can give up.
2. Negative valence: the number of electrons an atom can take up.
3. Covalence: the number of pairs of electrons which an atom can share with its neighbors.

It is recommended that only for valences of the covalence type should definite bonds be indicated in chemical formulas. One of the particular advantages of the present theory is that it becomes easy to distinguish between covalence and the other types and thus to predict with certainty in what way electrolytic dissociation will occur, if at all.

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## WHEN IS POISON NOT A POISON?*,[1]

BY JOHN URI LLOYD, PHARM. M.,

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A reply to the above question might be: When, for any reason, a substance is harmless in action, immediate or remote, be it applied

externally or taken internally. In other words, it is *not then a poison.*

This leads to the question: "Can a substance be considered as a poison at one time and innocuous at another?" To this one might make several replies, as the problem is viewed from its several side-angles.

For example, sulphuric acid, in concentrated form, applied to the skin or taken internally, will at once disintegrate flesh. Its action is then that of a corrosive agent, its destructive influence resting directly upon avidity for water and its power of abstracting water from liquids and even from tissue, to the tissue's complete destruction. It thus, under these conditions, becomes a corrosive poison.

As an example, one might state that white sugar is a carbohydrate, composed of carbon and the elements of water in the proportion to theoretically produce water. Place a lump of white sugar on a plate and then pour upon it a little concentrated sulphuric acid. Immediately it turns yellow, then black, owing to the liberation of carbon (charcoal) by the abstraction of its companion oxygen and hydrogen, which the acid takes, to the destruction of the sugar.

Dilute the same amount of sulphuric acid with water, to pleasant acidity, and it no longer destroys tissue on contact therewith, nor is it immediately harmful to the stomach. The sugar dissolves in it, colorless, when it is thus diluted. Indeed, as an acidulated drink (circus lemonade), much diluted and flavored with lemon oil, it has been used, without immediate corrosive effect or injury, as a substitute for lemonade. This practice, however, is now wisely forbidden.

To sum up, in one form, sulphuric acid is destructive to living tissue; in another form (dilute), it acts differently. The amount that, concentrated, would disintegrate tissue if applied locally, is, when diluted, harmless.

Take next arsenic. With the normal human being, arsenic, in comparatively small doses, is death-dealing. But with some persons, artificially made immune, a dose that poisons others is harmless. Arsenic eaters come within the scope of habit-forming drug addicts. The habit-formed principle applies likewise to morphine and similar drugs. Be the arsenic or morphine dilute or concentrated, a toxic amount to the normal man acts as a poison. Be it, for example, six grains of morphine, in substance, or six grains dissolved in an ounce of water, the same exerts its poisonous influence, providing

the whole amount be taken at a single dose. Indeed, dilution may even increase its activity.

Be it said that, although arsenic, morphine and such as these act as poisons upon the normal man, an individual may, as above stated, accustom his system to the drug, so that enormous doses may be taken without apparent injury. In this no comparison can be made with the cited action of sulphuric acid of which a drop on the skin of any man will bite its way to the tissue beneath, but yet can with impunity be swallowed when diluted with water.

We may likewise pass to other material that exercise special influences, but where, so far as we know, artificial habit-forming methods have no part. Rhus toxicodendron both excretes a substance and carries a volatile something that produces violent toxic action on some persons, while to others it is as harmless as bedewed grass. A waft of air over the dew-covered vine may close the eyes of a strong man exposed to its air-wafted influence, may cover his body with a most painful eruption, may drive him to seek his physician's aid.[2] Another man or a fragile girl comes next and with impunity, with bare hands, pulls the vine from its fastenings. The eyes of the first man may be closed by the attenuated "poison," imperceptibly attenuated by the gentle breeze, beyond the chemist's art to indentify, while the other person, bespread with its juice, has not even a pimple on his hand. Thus, "poison ivy" is, or is not, a poison, as the individual is or is not susceptible to its influence.

As an illustration, the writer each year has laboratory use for many thousand pounds of rhus toxicodendron (poison ivy). The green leaves, when in their prime, are gathered by collectors, who in midsummer, with bare hands and arms, strip the vines, crush the green leaves into sacks, and deliver the product with impunity. No immediate, or after-effect, is noticeable. One young lady of the laboratory force is so sensitive to the action of the drug as to respond to the emanations, although she be in a distant part of the establishment. To bottle and label "Rhus," or otherwise handle a preparation, means to her typical rhus poisoning. Consequently, at such time, she has a vacation, not being allowed within the establishment.

Once we knew a man to be vaccinated with a virus-crust that, used in equal amount on others, produced no untoward action. And yet that man came near losing his arm. It is evident that not the virus, but the man, or some undetermined local cause connected

with his case, was then at fault. The *virus* was the actual disturber. Let us not overlook that in such cases as these local conditions, such as the syringe needle or skin uncleanliness, may be at fault, not the virus.

Physicians may recall the use of a hypodermic syringe from season to season, with no complaint. Then, in the course of ordinary injections, a patient is "poisoned" by the same dose of the same medicine previously employed, and injected with the same syringe needle. The question arises, what caused this exceptional action? Blame is likely to be attached to the virus, regardless of its innocence.

One might fairly imply that either in this one case the syringe needle was infected, or that a shred of foreign matter was injected, or that this one patient was exceptionally sensitive to the remedy employed. Vaccines are not in our sphere; we make no claim to capacity to speak as an expert in this field. But yet letters from patrons citing exceptional experiences in these directions lead us to accept that where one person, and only one, experiences such exceptional results with a preparation where hundreds of others find no untoward effect, the cause may be accepted as local or systemic, its exceptional action lying outside the preparation used. Such as this is a problem for serious study.

Full well is it known that tobacco is destructive to the life of most insects, and yet there are worms that thrive on the green leaf, as well as insects that thread the dried drug, and delight in the choicest cigars. To the one, green tobacco, to the other, dried tobacco, is a food. And yet, this writer was made "deathly sick," as frightened observers can testify, when a film of collodion containing a fraction of a drop of nicotine was painted back of the nail, on the first joint of his thumb. Within a few moments alarming results followed, the poisonous film was at once washed off with chloroform, ammonia to the nostrils and stimulants internally being promptly administered. And yet, without any untoward influence, thousands of employees breathe with impunity the close air of tobacco warehouses, cigar factories, and constantly handle strong nicotine tobacco leaf.

Capsicum, in substance, is heroic, as all who have experienced its direct action will testify. But yet a beetle (undetermined, so far as we know), feeds on powdered capsicum, and burrows in its depths. To that insect capsicum is a choice food, and to the Mexican, in excessive amounts, it is but a pleasant condiment.

The plant known as sanguinaria (blood root) contains large

amounts of energetic alkaloids that vomit man, when taken even in small doses. And yet a single mole exterminated a bed in which this essayist took much pride. At least, by circumstantial evidence, the mole got the blame for the offense.

In like manner, biologists are aware that heroic poisons fail to act with some animals, while substances "not a poison" are destructive to others.

"Chambers" is authority for the assertion that natives of Africa drive hogs through serpent-infested sections, the hog not being susceptible to the virulence of that viper. It is stated that the beast presents its cheek to the serpent, then grasps the reptile in its mouth. Tradition has it that the hog is likewise immune to arsenic. Country people have a tradition that a full pail of milk from a newly-calved cow will kill a hog. The father of this essayist doubted the statement and fed a valuable hog a full portion of the first milking. The hog died that night. Seemingly, the experiment succeeded. And yet the cheese made of the first milking of the "nannie goat" commands exceptional value in Smyrna.

The miasmatic fog that catches one person may fail to affect neighbors equally exposed. A plague may sweep away a multitude and yet miss an individual member of that multitude.

Thus we find that the term *poison*, whatever the dictionary definition may be, carries undercurrents of opportunities for questionings, as well as investigations, that make the answer to the question, "*When is a poison not a poison?*" more of a problem than a cursory glance would indicate.

And yet, since, as a rule, such peculiarities as these are exceptional, a cause for each exception unquestionably always exists. The *reason* therefor, in obscured conditions, is an opportunity for science research, the facts having, as a rule, been incontrovertibly established by empirical record. The man of experimentation, opportunity and thought has surely, here as elsewhere, accomplished his share in the chain of progress when he hands to his co-laborer a statement of fact based on balanced observation.

*From *Eclectic Medical Journal*, April, 1920.

[1] Definition—Poison: "Any substance applied to the body, ingested, or developed within the body, which causes or may cause disease."—DORLAND.

[2] The remedies offered as "poison ivy cures" are legion. This writer believes that the action is often remote from the drug attack. The chain of systemic reactions that produce the body-bred toxines may be likened to the Biblical "third and fourth generations."

# THE PRESENT STATUS OF COMPULSORY HEALTH INSURANCE.

REPORT OF THE COMMITTEE ON SOCIAL INSURANCE READ AT THE NINTH ANNUAL MEETING OF THE AMERICAN DRUG MANUFACTURERS' ASSOCIATION HELD AT THE HOTEL BILTMORE, NEW YORK CITY, APRIL 12-15, 1920.

This being an off year, legislatively speaking, there isn't much to report regarding the movement for compulsory health insurance. During the past winter, interest has very largely centered right here in the State of New York. As a matter of fact, indeed, the leaders of the movement have largely concentrated their forces on New York ever since they were so effectively defeated in California two years ago.

## COMPULSORY HEALTH OPPONENTS GAINING STRENGTH.

There is now pending in the legislature of this State a bill providing for the realization of compulsory health insurance. This is the fifth annual measure of the kind. Last year the struggle was most dramatic. It looked for a week or two as though the proponents of compulsory health insurance would triumph, but the day was finally saved. This year it would appear that the opposition is much stronger. We gather from what we are able to learn that the present bill is not likely to succeed. Not only are its opponents much better organized and far more powerful, but the legislature seems to have troubles of its own and the Davenport measure has become more or less of a side issue.

New York State, indeed, is admirably organized against this fanatical movement. The Merchants' and Manufacturers' Association, with which our body has been affiliated, has carried on a very effective campaign of education. The New York League for Americanism has likewise stepped into the breach and has done most effective work in showing up the sophistries and fallacies of the scheme. And the three groups most directly affected, namely, the physicians, dentists and druggists, have here and there throughout the State coöperated in the establishment of "guilds" and have fought compulsory health insurance tooth and nail.

These "guilds" did heroic work last fall. During the campaign just prior to the November election, a working committee was appointed in each assembly district composed of two physicians, two druggists and one dentist. Each committee called on the candidates

for both the Assembly and the Senate to ascertain their views with reference to compulsory health insurance and to ask for a pledge of opposition to any bill providing for such insurance. A fight was promptly waged against those candidates whose views were held to be contrary to the public interest, and the result was that ten of them went down to defeat. This furnishes one reason why the legislature this year is not quite so keen for compulsory health insurance as it was last.

Passing by the situation in New York State, it may be said, as we have already intimated, that the issue has not elsewhere been a very active one during the past winter. New Jersey seems at the moment to be in favor of compulsory health insurance, but the "guild" idea is being developed in resistance to it, and the history of New York State will doubtless be repeated. Pennsylvania has agitated the subject, but has done nothing acute. The sentiment for such insurance in Ohio, under a little stimulation from Governor Cox, is rather favorable to the scheme. Indiana has a commission at work, but it is apparently not active. Wisconsin has entertained some discussion of the subject, but has apparently not gone beyond the debating stage. The issue has been a fairly live one in Minnesota, where it forms a part of the propaganda involved in the so-called Non-Partisan movement, but nothing is threatened for the immediate present.

So much for the situation at the moment. Now a few words about the character of the movement in general. These questions are frequently asked: Who are the advocates of compulsory health insurance? What sort of friends has the scheme got anyway? How active are they? What is the danger of success?

### WHO ADVOCATE COMPULSORY HEALTH INSURANCE?

We should say, after a pretty careful study of the movement compassing several years, that the advocates of compulsory health insurance divide themselves very naturally into the following classes:

1. The original group of academic doctrinaires and sociologists. These men for the most part are university teachers, and they sincerely believe themselves to be right. Unfortunately, as Samuel Gompers says of them, they are not open to conviction. They are zealous fanatics.

2. The governors and legislatures of certain States tinctured with socialism, especially the western group of States now carried away by the misbranded Non-Partisan movement.

3. The modern bolshevists who are out for anything that promises to foment class hatred, promote chaos, curb production, destroy prosperity and kill private initiative.

4. The men in every State who have the nose of a hunting dog for political jobs, and who see the vision of a great organization feeding at the public treasury.

Thus we find compulsory health insurance with a peculiar assortment of friends. It is at once to be observed that, not the lion and the lamb, but the zealot and the crook lie down together. Not politics only, but socialistic "reforms" as well, make strange bedmates.

In the early days of the movement it was thought that the medical profession was in favor of it. For a time the medical profession, indeed, was in favor of it. But now we find physicians arrayed strongly among the opposition, and we observe them to be well organized in one or two States where the issue has reached the stage of practical danger. In this State, for instance, you will see medical organizations resisting the movement to the last ditch.

### LABOR OPPOSED TO COMPULSORY HEALTH INSURANCE.

The various groups in favor of compulsory health insurance all unite in declaring that it is primarily for the benefit of labor. But the somewhat amusing and certainly very effective answer is that labor itself doesn't want it. It is true that a few scattered units of labor, here and there, have at times been in favor of compulsory health insurance, but the great body of the rank and file, as well as the national officers of authority, are vigorously in opposition. As recently as January 30, of this year, at a meeting here in New York of the National Civic Federation, Samuel Gompers made the following statement:

> It has come to me that recently some person has declared that Gompers has been won over to compulsory health insurance. I have already made my answer, which is that I am unalterably opposed to it.

We may be perfectly sure that Mr. Gompers and his associates would definitely align themselves for compulsory health insurance if it were something beneficial to the laboring man. These men are in favor of several movements in behalf of the laborer which capital is resisting. Surely here is something that labor would want if labor found it desirable. The opposition of Mr. Gompers and other leaders is perhaps the most staggering thing which the proponents

of the idea have to face. It also sounds the death-knell of the hopes of those philanthropic doctrinaires who really think they are doing something for the benefit of the human race. They can't effectively push a "benefit" down the throats of union when labor itself has its mouth closed and its lips locked.

Nevertheless people who are in favor of a particular panacea always find it difficult to listen to reason. Mr. Gompers in the speech to which we have already referred went on to declare that "no matter how convincing would be the proof that compulsory health insurance is impracticable and impossible, there would still be those who would not change their position in the slightest degree, but who would still want it." In other words, they are not open to conviction. The doctrinaire doesn't want to be convinced and closes his mind against it. The self-seeker doesn't care whether he is convinced or not: he is of the same opinion still for reasons of profit.

### COMPULSORY HEALTH INSURANCE FAILS IN ITS PURPOSE

As a matter of fact, indeed, the only excuse for compulsory health insurance is that it would reduce the total amount of sickness on the one hand, and on the other would give the workman medical attention at a reduced cost. Experience in Europe has abundantly proved that compulsory health insurance does neither. As a committee of the Medical Society of the State of New York pointed out last November:

> There is no uncertainty about the evidence that the relative morbidity rate infant mortality rate and maternal mortality rate, has been much more materially reduced in the United States during the past twenty years than it has been in Germany and Austria, where compulsory health insurance not alone, but the whole scheme, including invalidity and unemployment insurance and old age pensions, have been in force. It can, therefore, be seen that compulsory health insurance as such plays a very small part in the reduction of length and severity of illness, and that on the whole it has been of extremely little value, medically, in those countries; while it has been the cause of a profound deterioration in medical service and medical morale. Even in England, where it has been in operation for a comparatively short time, it has proved so defective and ineffective for the purposes for which it was instituted that it is now proposed to inaugurate the plan of State medicine to supplant it.

Compulsory health insurance fails not merely to bring the benefits for which it is urged. It actually results in detriment to the public welfare. It is plainly prejudicial to the public interest, and

we sincerely trust that the more it is studied the more this fact will sink into the consciousness of the nation.

VOLUNTARY EMPLOYEE INSURANCE THE REMEDY.

At bottom, of course, there is some modicum of sense to be found in the movement for compulsory health insurance. Agitations of this sort are not all bosh and moonshine. The difficulty always is to separate the real from the unreal—the wheat from the chaff—the desirable from the undesirable.

Compulsory health insurance, as advocated by its friends, is simply impossible. It would do far more harm than good. But it may be possible to strip the movement of its evils and get down to the kernel of truth residing somewhere in the heart of the situation. It is perhaps undeniable that some means of insurance protection against sickness should be afforded to certain groups of people. How can this be afforded wisely and rationally?

Mr. Dunning has made a survey of the conditions existing in the plants of our members, and his findings are printed in connection with this report. It will be seen that already manufacturers are groping their way in an effort to deal with the employee in a way best calculated to protect both him and the employer. It may be explained also that during the last few years insurance companies have offered manufacturers a type of protection considerably in advance of group insurance in its original form. Originally group insurance covered death losses only, but it is now possible to buy protection which covers sickness as well.

The insurance companies are earnestly engaged in studying the whole problem, but they find it a complicated one. The laws in the different States are very confusing, and it is exceedingly difficult to suit any one form of insurance to differing conditions and requirements. The general aim seems to be to get up some form of group insurance which will cover everything not taken care of under the State compensation laws. Evidently, as appears from Mr. Dunning's survey, some of our own members are already buying insurance of this sort. Ultimately, no doubt, the manufacturer who desires to protect both himself and his people against losses from sickness will find it possible to get just what he wants at a reasonable cost, and when this time comes the solution of the problem will have been realized.

For voluntary insurance is one thing, and compulsory insurance

is quite another. Voluntary insurance can be economically handled. It will be subject to the laws of competition. It can be purchased by each manufacturer to suit his own particular requirements, and used by him just as long as he finds it beneficial. Compulsory health insurance, on the other hand, drags a long train of evils behind it. It involves an expensive and inefficient organization. It means incompetent and underpaid medical service. It means cheap drugs. More than anything else it means compulsion—and compulsion is repugnant to the free spirit of America. Compulsory health insurance has never yet, in any country where it has been adopted, worked out to the satisfaction of the impartial student, but voluntary insurance may well be contrived which will meet the situation as far as it ought to be met.

Just how far, however, efforts to establish voluntary health insurance will head off the movement for compulsory health insurance remains to be seen. The latter is being pushed with an astonishing amount of vigor. It is apparently gaining strength year by year. Fortunately, however, the opposition is likewise gaining strength, and it may be safely predicted that the battle will be waged more or less fiercely for a number of years to come. We must all of us be on our guard in order to head off a German-made propaganda which would do infinite harm to America if it ever gained a foothold on our soil.

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## A SURVEY OF EMPLOYEE INSURANCE CONDITIONS AMONG MEMBERS OF THE AMERICAN DRUG MANUFACTURERS' ASSOCIATION.

By H. A. B. Dunning.

Thirty-two of the fifty-six members of the American Drug Manufacturers' Association answered our questionnaire in reference to their policy relative to the protection of their employees against loss of income through sickness, ill health or misfortune.

Twenty-seven members stated that they had no form of insurance for their employees against loss of income through sickness, ill health or misfortune. Five companies have some sort of protection, either for the employees or among the employees, only one, however, having anything that approximates a mutual relationship. In this instance, one of the plants of the company has group in-

surance against sickness, ill health or death, the company paying one-half of the premium for such employees as desire to pay the other half and derive the benefit.

EMPLOYEE PROTECTIVE ORGANIZATIONS.

The employees of four companies have protected themselves more or less independently of their employers. In one instance, the employees have a death benefit fund, to which each member, upon joining, pays the sum of one dollar, and subsequently is assessed one dollar upon the occasion of every death within the organization. This is strictly an employees' organization.

The employees of another company have developed a very complete system of insurance, which they call the Mutual Aid Society, and which exists for the benefit of factory workers employed at hourly rates. Any such employee is eligible to membership, and dues are paid according to the amount of benefit desired, the monthly dues being five per cent. of the sum received per week in case of sickness. The amount of compensation is governed by the amount of wages earned per week. Any member of the society may insure in the grade designated by his salary, or in any lower grade, but not in any higher. No member who has not belonged to the society for one month may receive any benefit in the case of absence. Should the company continue to pay wages to an employee during his absence, no benefit is paid by the society. Benefits are paid for a period of not more than eight weeks in any consecutive twelve months. In the case of deaths, the sum of fifty dollars is paid by the treasury of the society to the person or family designated as the beneficiary.

In another company, the employees have an organization in which, for a nominal fee paid upon joining, members are protected in the event of illness, for a period not exceeding twenty-six weeks.

In another instance, there exists a Relief Fund, the disbursements of which are controlled by a committee of employees elected by fellow employees. There are no regular dues, but the weekly bonuses paid by the company to those who have not been tardy or absent during the week are turned over by the company to the fund. In cases of illness, the employee may draw upon the Relief Fund for money, which is generally considered as a loan, and is paid back upon his recovery, although in some cases, where this is impossible or would involve undue hardship, the sum is given outright.

PAYMENT OF SALARIES DURING ABSENCE.

Of those companies which have no plan of insurance for employees, six pay full salaries unconditionally during absence due to illness. The general tendency of the majority, however, is to be governed by the conditions of each individual case, and the feeling seems to be that any hard and fast rule is liable to inflict a certain amount of injustice. Full salaries are paid by five companies to salaried employees, office workers, heads of departments, etc., but in all except one of these cases, laboratory employees or others working on an hourly basis of payment, receive no pay whatever during absence. Two companies, while not paying full salaries during absence, pay all doctors' bills for the employee who is sick. In another company, each office employee is allowed thirty days' sick leave throughout the year, and receives extra pay for whatever time is not used out of this allowance, there being no pay during the actual time of absence. One company in a State which requires State compensation insurance, pays the difference, in cases of sickness, between the amount allowed by the State, which is two-thirds of the weekly salary, and full pay. Only one company makes no provision at all for absent employees.

Of those companies which do not pay full salary during absence, one pays eighty per cent. of the weekly salary, one pays one-half, one makes absolutely no allowance, three pay half or full salary, dependent upon conditions, and eight are governed by circumstances as to what portion of the weekly salary is paid during such absence.

In regard to the length of time during which some sort of pay is given by the companies to absent employees, there was a wide variation. Here again, the individual case governed the course followed by many, and length of employment, value of the employee to the company, and the amount of salary received are determining factors. Fourteen companies replied that they were influenced by these considerations. Two companies continue to pay salaries indefinitely, so long as conditions justify their doing so. Two companies pay no longer than a period of two weeks; two pay no longer than three to four weeks, unless unusual conditions warrant it; the Mutual Aid Society above referred to allows compensation for a period of not more than eight weeks during each consecutive twelve

months; the employees of another company are protected by themselves for twenty-six weeks. One company continues to pay salaries for three months, but no longer, while two others pay for a reasonable time. Two companies continue to pay salaries until the rerecovery of the employee, and only one makes no provision at all.

There was a marked difference of opinion as to how long an employee must have been with a company before he is entitled to pay during absence. Five companies make no requirement of such previous service whatever. Eleven replies state that there is no general rule, although length of service is a determining factor in their course of procedure. There is a requirement of thirty days' membership in the Mutual Aid Society, and the company whose employees have organized this society requires an office worker to have been employed for six months before any allowance is made for absence. Two firms require employees to be with them for three months before paying salaries; three firms have a requirement of one year's service. Two years' service is required by another company while five years or more are required by still another, although exceptions to this unusually strict rule are made.

In conclusion, five companies suggested that they would be glad to receive any assistance possible from the Secretary to enable them to work out the problem of employees' insurance, to which they have been giving considerable thought. One company stated that in its opinion any general policy to govern such instances would be unfair, as the circumstances of nearly every employee's absence are different, and that some injustice would probably follow an attempt to make all cases conform to the same rule. Another company suggested some form of insurance to which both the employees and the company would contribute, thus dividing the responsibility and increasing the feeling of mutuality between employer and employee. Group insurance covering death but not sickness was the suggestion of another company, as the payment of salaries during the period of absence takes care of the employee without developing the paternalistic attitude.

HARRY B. MASON, *Chairman.*
F. M. BELL,
H. A. B. DUNNING,
E. H. NELSON,
J. H. FOY.

# GREAT POSSIBILITIES IN THE ASSOCIATION'S LATENT POWER.

REPORT OF THE SECRETARY, W. J. WOODRUFF, AT THE NINTH ANNUAL MEETING OF THE AMERICAN DRUG MANUFACTURERS' ASSOCIATION AT THE HOTEL BILTMORE, NEW YORK, APRIL 12–15, 1920.

This year's report of the Secretary is inspired by a conviction that has been growing firmer in his mind for some time. If I may be permitted to indulge myself in a home-made text for my sermon, let me offer this—"The horse in the barn doesn't turn any furrows." To be less figurative, your presumptuous Secretary believes that, while the membership, with industry generally, is complainingly permitting itself to be seriously hampered by adverse influences, it possesses vast potentialities for correcting those evils of which it is not availing itself.

## GREAT LATENT POWER.

It is safe to assert that, with the single exception of the Proprietary Association, no single factor in the Drug Trade or Medicine possesses the potential power for remedying its evils that this industry possesses. It is likewise safe to say that no industry is using so small a proportion of its potential power in its attempts to meet its problems.

The fact that an association represents a manufacturing industry implies powerful reserves of organization experience—of big caliber men—the association can say the last without immodesty for men who manage such great units can be nothing else—and—but here I must focus my meaning well—if I mention capital as a source of power, I do not mean to imply its use as a force for coercion, corruption, undue influence or suppression of truth or justice, or for any other use immoral or even unethical. I mention it rather for the legitimate uses to which it can be put, uses in no way inconsistent with the public welfare. We could be charged with nothing worse than a desire to have justice done us if we used it, let us say for the dissemination of truthful information that would make the public proof against the misrepresentations of either those with ulterior motives or of well intentioned but ignorant reformers.

The A. M. A. has long been regarded by many in pharmaceutical and medical circles as the dominant factor in these fields, with

almost irresistible power for bringing the other factors into absolute subjugation, if it should ever will to so exercise its strength, which I am not contending. Yet, why should this be so? Their organization, it is true, has the advantage of many years more building than has our own, but it is nothing that could not be easily duplicated were the organization experience of the membership applied intensively to the task. And outside of this, the natural advantages are with this association. It cannot be said that the financial resources of the A. M. A. are anywhere near as great as those of this industry. And it must be admitted that their organization lacks the coherency of one with our smaller and more compact membership. The interest of the average physician in the A. M. A. is only general in character. The A. M. A. can only deal with problems that affect him indirectly in a scarcely palpable way and besides he is not likely to be in sympathy with all its decisions. It would be a physical impossibility for an organization with better than 50,000 members to reflect the sentiment of the individual as accurately as does our own association of from fifty to sixty members, and to reflect it, moreover, 99 times out of a hundred. The so-called advantages of its members are in my judgment negatived by the disadvantages. What elements of strength its numbers do possess are offset, it seems to me, by the fact that you cannot compare the influence of a single individual physician with that of a manufacturing establishment such as goes to make up our membership.

There is nothing that the A. M. A., or any other Association, has done or can do that we cannot equal, or—if their activity is adverse to our legitimate interest—offset, if the industry is only of a mind to devote a fair proportion of its resources of brains and money and experience to the enterprise. Let me put you at your ease. This is not a preface to the submission of some proposal involving vast expenditures. I am not coming to you with a proposition on which I expect you to act at this meeting. It is simply my intention to put to you more concretely than I have done before some of the constitutional remedies that appeal to me as cures.

If, acting on your own initiative, you should ever see fit to adopt them, they would call, it is true, for much larger sums than you have been in the habit of expending on Association activities. Their proportion to the sales of the industry, however, would be trifling compared to the proportion that an advertising appropriation of reasonable size bears to the advertiser's annual gross sales, and the

good they would accomplish would make the expenditure an even more profitable investment.

THE ADVERTISING OF EDUCATION.

In past reports I have hinted in perhaps rather vague terms that this industry needs a good constitutional tonic in the shape of a more accurate public conception of its importance and a more sympathetic understanding by the public of its problems. In the belief that the membership have grown sufficiently strong in the coöperative spirit to perhaps lend me a sympathetic ear, I intend now to speak more concretely and pointedly on this subject. I hope whatever reputation for level headed judgment I may possess will not suffer. To speak frankly rather than modestly I don't think it should. If my ideas seem radical, then I am in the same boat with the best brains of many other representative industries of the country for they are doing what I believe this industry should do. They are coming out openly as becomes honest men, and are using the advertising columns of the newspapers and periodicals to portray for the public their ideals and their problems and the interest that the public has in their welfare.

This is not the advertising of buying and selling; it is the advertising of education. Those who are advertisingly near sighted and conceive of advertising simply as a medium for telling the reader you have something to sell should put on glasses that will enable them to see the bigger field beyond in which advertising loses its commercial character and takes on the guise of an educational force that commands respect and silences critics.

We find a host of industries using it as means of broadening the vision of the people as to the useful possibilities of some utility, and thus increasing the market for that utility as a whole without reference to a particular brand. In this undertaking are enlisted the orange growers, the manufacturers of white pine, and a number of other industries whose names I do not recall. This advertising has a commercial aspect, it is true, but it has not a selfish aspect for, to increase the public knowledge of the uses of white pine, for instance, benefits all manufacturers and growers of this lumber regardless of membership in the Association under whose auspices the advertising is conducted.

But the faintest taint of commercialism cannot be attributed to that phase of advertising that is dedicated solely to the purpose of

cultivating a better public appreciation and understanding of an industry and the country's interest in its welfare. We find the packers, the telephone companies, the Ayer's Advertising agency, and, a recent recruit, the National Canners' Association, to say nothing of many others, all maintaining advertising campaigns of this character. Were you to read one of the better types of advertising copy of this class in other than the make-up of an advertisement, you would be more inclined to suspect it of being a portion of an article from the reading columns, written by some disinterested party, so restrained are they apt to be in their references to the industry in whose interest they are published and so commendable are many of them from the standpoint of literary criticism. You might be impressed by the new and greater conception of that industry that the imagination of the copywriter imparted to you by figures of speech that would do credit to an author of literary pretensions, or you might admire the rich fancy of the artist who illustrated the text with a finesse akin to that of a master of the academy. You would find in short an appeal to your cultural rather than to your commercial sense.

To make my meaning more clear by example, just consider the following copy that appeared in an educational advertisement of the Telephone Company but which might just as well have formed a part of an essay.

"Cave Life or Civilization.

"Civilized man is distinguished from the cave man by his habit of coöperation.

"The cave man lived for and by himself; independent of others, but always in danger from natural laws.

"To the extent that we assist one another, dividing up the tasks, we increase our capacity for production, and attain the advantages of civilization.

"We may sometimes disregard our dependence on others. But suppose the farmer, for example, undertook to live strictly by his own efforts. He might eke out an existence, but it would not be a civilized existence nor would it satisfy him. He needs better food and clothes and shelter and implements than he could provide unassisted. He requires a market for his surplus products, and the means of transportation and exchange.

"He should not forget who makes his clothes, his shoes, his tools, his vehicles and his tableware, or who mines his metals, or who

provides his pepper and salt, his books and papers; or who furnishes the ready means of transportation and exchange whereby his myriad wants are supplied.

"Neither should he forget that the more he assists others the more they can assist him.

"Take the telephone specialists of the Bell System: the more efficient they are, the more effectively the farmer and every other human factor of civilization can provide for their own needs and comforts.

"Or take our government, entrusted with the task of regulating, controlling and protecting a hundred million people. It is to the advantage of everyone that the government shall be so efficient in its special task that all of us may perform our duties under the most favorable conditions. Interdependence means civilized existence."

## EVADING THE PHYSICIAN'S PREJUDICE.

It has long been a belief of the ethical medicinal manufacturer that, since his sales leverage is on the physician, any advertising of a popular nature would be a lethal dose to his business. Like a good many other business traditions, it has been accepted as an axiom unnecessary of proof. A little effort to think all around the subject would, I believe, dethrone it from this position just as many other so-called business axioms have been dethroned by some hewer of new trails who has made an undreamt of success largely because he disregarded the rules of the game and played it in a new way.

The ban of the medical profession against advertising to the public is based on the very laudable principle that the calling of the physician is too noble to be made a subject of commercial exploitation. It was imposed in the days when advertising was a crude thing of "best on earth" boasts in brazen and ugly display and when a business man had no other vision of advertising than as a medium of telling greater numbers than his salesmen could reach that he had something that he wanted them to buy. It is the very antipodes of the educational advertising of the sort proposed here, advertising that seeks only to enlighten and whose physical nature is commendable from both literary and artistic standpoints. The prejudice of the physician against advertising that goes to the people should not be regarded as a rock that absolutely bars the passageway. It may be a rock but there are plenty of passages around it, and it is

only a case of steering wisely to evade it. It simply means that care must be exercised to avoid the slightest exaggeration, the slightest misstatement, the slightest suggestion of idle, boasting, or the slightest tendency to lower the dignity of the medical profession or to commercialize human suffering. These are negative virtues and, not content with their observance we should seek to impart qualities to our advertising that would positively tend to win the commendation of the physician.

Copy of a restrained tone written in a style that would reflect lofty sentiment could not do otherwise than impress him favorably; neither could an illustration artistically picturing some of the nobler aspects of the physician's art, or some altruistic phase of medicinal manufacture. And if the advertising treated of the whole cycle of the healing art, the physician, and the pharmacist, as well as the manufacturer, picturing to the people the public service the physician and pharmacist renders, your advertising would not only be unobjectionable to him but it would be a positive agency in cementing his goodwill, and the goodwill of the druggist as well.

STYLE OF COPY RECOMMENDED.

And now let me give you a concrete illustration of how such copy as I have described could be used to cultivate a sympathetic public attitude and at the same time the goodwill of the physician and the druggist. It is hurriedly written without due consideration of the points of which the first advertisement should treat, and falls far short of literary merit but it serves to illustrate the style that I am trying to explain.

When the faint glow of the last ember of life brightens under the ministrations of the physician at the bedside, and your loved one comes back to you from the brink of the Great Shadow, your heart, for the first time, wells up with all the gratitude that this, humanity's greatest earthly friend, deserves.

You repay him then in speechless thankfulness for his sleepless nights of watching, his midnight hours of study, and the sunny holidays of youth spent in sombre college laboratories. And in your gratitude, think sometimes of his silent partners—the workers to whose tireless research and exacting care are due the contents of the bottle with which the magic was wrought.

The genial proprietor of the corner drug store may seem simply an obliging merchant to whom you are indebted for a hundred little

services, but he, too, is a professional man—a pharmacist who has paid his toll in arduous study. Had he erred in the pharmacist's delicate, hairline task of filling the prescription, the physician's skill might have only served to mend the ravages of your passionate grief.

And behind the physician and the druggist is the great army in the manufacturing establishments in which the ingredients of the prescription were made. The bacteriologists, the pathologists and the research chemists who, in the face of a weary chain of failures, developed and perfected the formulas. The financial captains who unflinchingly watched thousands upon thousands of dollars sunk in fruitless experiments before the first glimmer of success. And the workers who throughout every step of the transformation of the crude chemicals into the finished preparation tested and retested its power and purity.

### SUGGESTED FACTS.

You observe that I would rely on indirect suggestion to get my points home rather than on the force of direct statement or argument. It is because facts that are implanted in the reader's mind subconsciously by force of suggestion are less likely to be challenged by him than are those which are stated baldly to be facts. As for argumentative copy, its use immediately puts the reader in an argumentative frame of mind and he is very likely, from the sheer contrariness of human nature to take the other side.

In the last paragraph it is the intention to awaken the reader to two facts which I believe are contrary to the prevailing impression—first to the fact that the plant of the medicinal manufacturer is really a scientific laboratory and his force composed of scientific experts, and second to the fact that it is to the medicinal manufacturer that Medicine owes a big share of the progress in the development of remedial agents.

In the manner in which these points are here stated their acceptance by the reader is assumed and this very fact tends to induce him to accept them under the impression that nobody questions them. Were the entire five paragraphs to be devoted to proofs of the truth of these propositions, it is doubtful if the reader could be induced to accept their verity as readily. The very fact that you deemed it necessary to prove them would cause him to reserve judgment under the impression there are "two sides to the story."

The latter method, it is true, would leave no question in the mind

of the reader as to what you are "driving at," and, conversely, it is true that the methods used in the copy, being less obvious, might cause the meaning to escape more persons than in the case of the former. But the secret of successful advertising is the repetition of the same thought in a number of fresh ways until continuity of impression has firmly implanted it in the mind of the reader, and if you can get your idea home without stirring up doubt your task in the end will be a shorter one.

AIMS OF THE CAMPAIGN.

Every advertising campaign that hopes for conspicuous success should be carefully planned from beginning to end before the first piece of copy is written. Its aims should be carefully defined and every individual advertisement should be prepared with that aim in view, in order that each may contribute to the continuity of impression that means advertising success. What the points should be in the first campaign of this industry is a matter for careful discussion. I would venture the suggestion however, that

1. It should explain the mission of each of the principal factors in the drug and medical worlds and endeavor to impress the public with their worthiness and their vital consequence. This would make such a campaign seem more altruistic and help to instill in the public an impression that the industry is inspired by other than purely selfish motives. It would, moreover, increase the goodwill of these other factors for the industry and would serve to contribute to.

2. The second aim which is to awaken the public to the fact that the remedial agents of the medical profession do not "just grow" but are the product of a distinct industry.

3. Thirdly, it should impress the people with the fact that this industry is imbued with the ideals of the medical profession and that while it is naturally looking for a reasonable profit its zeal to serve the public and the profession will brook no sacrifice in quality or service.

4. That it is to the medicinal manufacturer that Medicine owes the development of its medicinal agents, and

5. That there is no industry in whose welfare the average individual has a greater interest, that undue restraint on its liberty of action hampers one of the biggest factors in medical progress, and that it

is to the interest of the public to safeguard its production in times of embargoes, shortages and other adverse conditions.

SIZE OF THE CAMPAIGN.

It would of course be neither feasible nor wise to attempt a campaign of the dimensions of the Wrigley's three million dollar per annum appropriation. Nor would it be positively necessary to resort to a campaign of the size employed by the Telephone Company or the Canners' Association. The industry could feel its way, always remembering however that there is a minimum beneath which its advertising effort would not be worth the ineffectual results accomplished. Of what that minimum consists is a matter for careful consideration. I would suggest the following however as the most conservative campaign from which justifiable results could be expected. There should be selected the six representative national magazines of general circulation which would cover the country as adequately as possible. The industry could contract for six insertions in these magazines for the year to be alternated so as to give it three insertions in three magazines one month and three in the second trio the following month. Your advertisements would thus follow each other at monthly intervals and this would mean that a large proportion of your readers, those, in other words, who read two or more of the magazines in question would be reached every month.

The amount of space taken should in your Secretary's judgment be a full page. This space tends to give your reader the impression of a large campaign and humanity has great respect for size, attributing to the full page advertiser a place as one of the larger and more representative industries of the country and consequently one whose standing is in some measure a guarantee of integrity.

The full page advertisement likewise has greater proportionate attention value for the page carries no other advertisement with which yours must compete for the reader's attention. It must also be borne in mind that the effect of the admirable lay-out of one advertisement may be absolutely destroyed by that of an adjacent advertisement which does not harmonize with it. Then, too, the full page displays your illustration or your copy to an advantage that is lost in smaller size space. The necessity for the use of larger space increases moreover with a reduction in the number of insertions.

It is not pretended that a campaign of this number of insertions

in this number of mediums would be as effective as a campaign of, for instance, twelve insertions in a larger number of journals, all conditions being equal. But it could be made as effective as many campaigns of twelve insertions in a much larger list of mediums, if careful workmanship and a policy of giving quality the right-of-way were fruitful in producing advertisements of unusual interest and attention value, and also if the six mediums were selected with requisite care.

FOLLOW-UP OF THE CAMPAIGN.

The auxiliaries that could be brought to the support of such a campaign are multifarious but there is one that I would particularly recommend. Your magazine advertisements should be calculated to arouse an interest in the reader—perhaps in the form of curiosity—for further information of a character that would further the objects of your campaign. If the advertisements were a success in this respect, we would find our readers impressed in varying degrees at any given stage of the campaign. Some would be just sufficiently interested perhaps to watch for the next advertisement, others would be sufficiently interested to send for a booklet giving promise of satisfying their human thirst for accounts of the mystical or the magical or the unexpected. The very fact that he thinks of alcohol only as a thing of evil would arouse the reader's curiosity in a booklet with some such title as "Our Faithful Servant Alcohol," while others who take umbrage at the loss of their daily glass of beer or wine would be interested in it out of a sympathetic attitude for a friend whom they think is being unduly abused. A colorful but accurate story in popular language of the wonders alcohol performs as a solvent would be of as great if not greater interest than "the story of a grain of wheat" or "the story of a piece of coal" or other popular science stories of their ilk.

In thinking of the distribution of such booklets through popular advertising, you must think in terms of hundreds of thousands. Think of what it would mean to educate such an army to the fact that there is a praiseworthy use of alcohol that must be safeguarded, and if you made proper use of your material you would incidentally develop some one of the fundamental aims of your campaign. To take one of those I have suggested you could in the development of your story of alcohol treat of some conspicuous example of a therapentic agent developed in the laboratory of the manufacturer and

impress this same army with the fact that the medicinal manufacturer is one of the most important factors in the scientific progress of curative agents.

EFFECT OF CAMPAIGN.

In the past years of the Association's existence, I verily believe that the industry has not become known to as many as ten thousand persons outside the medical and pharmaceutical worlds. In one year, a campaign of this character would bring it to the attention, and that in a most favorable light, of hundreds of thousands, if not millions, of people, making them less susceptible to unsound propaganda and less likely to add their voices to the demand for legislation in response to it.

Besides this you have the consideration that magazines are read not only by the rank and file, but also by the bureau chief who formulates the regulation you must follow, by that legislative activating agent of great potency, the public-spirited clubwoman, and no less by the legislator, the editor, the preacher, and a hundred other influential elements in the body politic.

One legislator thus influenced might give your cause a champion sufficiently strong to turn the tide of a legislative contest in your favor and one editor impressed with your important public mission and your worthiness might give your cause the weight of a journal of great influence in molding the opinion of thousands of readers.

You stand to gain not only the benefit of a sympathetic public opinion in the aggregate but also the championship of single elements in that heterogeneous mass called the people whose goodwill can be of great direct benefit to you. Your activities would likewise tend to stimulate a public interest in matters medicinal that would react on the public press and stimulate the publication of articles to your interest, articles all the more influential because they would not bear your stamp.

PUBLIC ESTEEM THROUGH SCIENTIFIC ATTAINMENT.

I hope I have said enough on this point of publicity to illustrate that the matter of giving ethical medicinal manufacture an influential and representative place among the industries of the country, a place that will make it proof against the domination of any other force, is simply a question of employing the great latent forces within ourselves that are now lying dormant.

Advertising in national magazines is not the only channel through which these forces can be applied. In fact the imagination can conceive of so many others that it is my purpose merely to cite one or two by way of illustration rather than to attempt to cover them all comprehensively. Let one additional one suffice.

When you consider the years of experience and accumulated data, the wealth of scientific brains, the elaborate organizations of laboratory equipment, and the great advantage of organized capital that is behind this industry your imagination must conceive a rather glowing picture of the leading place that the industry could attain in medical science if it would only make full use of its powers. It is quite true that we have the prejudice of the scholastic scientist with which to contend, but I hope to show that the prejudice is no very formidable obstacle after all.

There are innumerable drugs on which the literature is unsatisfactory or meagre. There are scientific men universally recognized as authorities and whose work on these drugs would at once receive recognition from all factors in the scientific world. In the archives of our members are many years accumulations of invaluable data on these drugs. There are besides some fifty odd laboratories whose coöperation would give a research worker ample corroborative tests.

If the membership were disposed to make full use of its resources the Association could select some problems whose solution would constitute a conspicuous contribution to the science of medicine, it could likewise retain a man of this caliber to devote a year or more of his time to it, and it could give him many years start on a private investigator working alone by placing the experience of its members at his disposal and by giving him the coöperation of these fifty odd laboratories.

His report published under the auspices of the Association and given freely to the world would be accepted on the strength of his name by even those ultra academic scientists who deprecate the work of commercial laboratories.

Conceive of the interest with which a work of so elaborate a character would be received by the Pharmaceutical and Medical worlds and ask yourself if many years would pass before these annual or biennial contributions to science by the American Drug Manufacturers' Association would take their place as one of the most eagerly awaited and most authoritative of scientific series. And, judged in the light of this work, the American Drug Manufacturers' Associa-

tion and the industry it represents would most certainly grow in public esteem.

It is from your Scientific Section that this recommendation, fathered by Dr. Eldred of Eli Lilly & Co., comes and though it may be the most ambitious recommendation ever made by the section it is only in keeping with the scale on which the Association should begin to do things if it would make the most of its possibilities.

The growth in the coöperative spirit in the industry which your Secretary has watched with a good deal of satisfaction during the past four years causes him to hope that the message of this report does not wander too far beyond the confines within which you think the Association should be kept. But if it does, he accepts your dictum with all the good grace of a loyal servant and he hopes in turn that you will pardon his frankness as inspired by a sincere desire to advance the interests of the membership.

## GOOD DRINKS MADE OF MILK.*

Milk drinks, made right, are unquestionably good. They are healthful, nourishing and delicious, and when made according to the methods prepared by milk specialists of the U. S. Department of Agriculture, no difficulty should be experienced in marketing them. Following are some methods for making buttermilk, yogurt or Bulgarian buttermilk, buttermilk lemonade and kefir or koumiss.

*Buttermilk.*—In making buttermilk from milk the same procedure should be followed as in making a starter for cream ripening. A good, clean-flavored mother starter should be carried along with every possible precaution to prevent contamination. Good commercial cultures can be obtained, but if it is not convenient to use one of these a natural starter should be secured. For this purpose the following procedure may be followed.

Select milk from several sources; put about one pint from each source into clean glass jars or bottles and allow them to stand in a warm place until the milk is curdled. When this occurs, put about 1 pint of milk into each of an equal number of bottles and hold in steam or boiling water for one-half hour. When these bottles of milk are cooled, transfer about 1 teaspoonful of milk from each of the bottles of sour milk obtained in the first operation to one of the bottles of heated and cooled milk. Allow these samples to cur-

* From *Pure Food Products*, Feb., 1920.

dle and repeat the process until one sample is obtained which curdles in at least 8 or 10 hours with a smooth curd free from whey and gas bubbles, and with a pleasant acid taste.

Gas bubbles, or the separation from the curd of a milky or straw-colored whey, show that the lactic-acid bacteria are still mixed with other kinds. Considerable variation in flavor can be found in different cultures, and care should be exercised to select one that gives a clean, sharp taste.

Propagate this culture in the same way from day to day. The amount of this mother starter which should be carried will depend upon the amount of buttermilk to be made. One quart should be enough for 20 to 30 gallons.

Add the mother starter to the milk to be used for buttermilk, or pasteurize the milk in a continuous pasteurizer at 180 to 185 degrees F. (82 to 85 degrees C.), or preferably hold the milk in water-jacketed vats or cans at 180 degrees F. (82 degrees C.), for thirty minutes to an hour, cool to about 70 degrees F. (21.1 degrees C.) and add the mother starter. The most desirable temperature for this fermentation is 70 to 75 degrees F. (21.1 to 24 degrees C.).

When this milk has curdled, cool it at once to about 50 degrees F. and churn thoroughly to break the curd into fine particles.

Buttermilk may be improved especially as to its texture and tendency to whey off, by the addition of about 10 per cent. of a milk culture of Bacillus Bulgaricus.

*Yogurt or Bulgarian Buttermilk.*—Propagate a small culture of the Bacillus Bulgaricus from day to day as indicated for the lactic culture for buttermilk. This culture may be obtained from various commercial laboratories. To prevent contamination by yeasts or gas-forming bacteria, it is necessary to carry this culture at a temperature of about 110 degrees F. A small egg incubator may be used for this purpose.

Carry in a similar way a culture of the ordinary sour-milk organism, which may be obtained from many of the commercial laboratories.

Thoroughly pasteurize the milk to be fermented. If a small quantity—5 to 10 gallons, for instance—is to be made, it may be done by holding a can of milk in a tub or vat of water heated by a steam hose. If a larger quantity is made, one of the starter cans used in creameries will be found convenient. These are essentially cylindrical vats with mechanical stirrers and a jacket which can be

filled with steam for heating or water for cooling. The milk should be held at a temperature of at least 180 degrees F. for not less than 30 minutes.

Cool the milk to about 100 degrees F. Draw off one-half and inoculate it with the culture obtained in the second operation. Inoculate the remaining half with Bulgaricus culture obtained in the first operation. The amount to be added will depend on the quantity of milk to be fermented, the time at which it is desired to have it curdled, and the temperature maintained during the fermentation. This can best be determined by experience. One pint should be sufficient for any amount between 10 and 20 gallons.

The milk inoculated with the product of the second operation may be held at ordinary room temperature. Precautions must be taken to hold that part inoculated with the Bulgaricus culture at a temperature of 90 to 100 degrees F. for several hours. If the milk is in cans it may be set in a tub of warm water. A large volume of milk in a warm room will maintain the proper temperature.

If one is unable to hold the milk at the desired temperature the amount of culture inoculation should be increased.

When the milk has curdled—which should be in 10 or 12 hours—mix the two lots thoroughly by churning or stirring together, bottle, and put on ice to check the acid formation.

*Buttermilk Lemonade.*—A refreshing and nutritious drink may be made by the addition of lemon juice and sugar to buttermilk, following the same procedure as in making ordinary lemonade. It will usually be found necessary to use more sugar and more lemon juice than in making lemonade with water. Buttermilk lemonade should be served very cold.

*Kefir or Koumiss.*—Use buttermilk or freshly curdled sour milk. This should be thoroughly agitated to break the curd into fine particles. Buttermilk containing Bacillus Bulgaricus will give a flavor too acid for most tastes.

Add 1 per cent. cane sugar ($1^1/_2$ oz. to the gallon). Add a small amount of yeast cake—one-fourth of a cake will be sufficient for 1 gallon of buttermilk. The yeast cake should be ground up in water so that it will be well distributed.

Bottle this preparation, leaving sufficient space to permit a thorough shaking of the contents. Strong round bottles of the type used for carbonated drinks should be used, as considerable pressure is developed by the fermentation. If the bottle is not provided

with a sealing device the corks must be securely tied or wired in place.

Hold for 4 or 5 days at a temperature of 65 to 70 degrees F., shaking every day to keep the curd well broken up. At the end of this time there should be considerable gas but not enough to blow the milk out of the bottle. It should have a pleasant acid taste with a slight bitterness. The fresh milk sometimes has a yeasty taste, but this gradually disappears. If the milk is kept on ice it will remain in good condition for two weeks or more.

## CURRENT LITERATURE

### MEDICAL AND PHARMACEUTICAL NOTES.

ESTIMATION OF SUGAR IN BLOOD IN DIAGNOSIS AND TREATMENT.—A study of more than 700 cases of diabetes by Cammidge has shown that there is no constant blood sugar level for the appearance of sugar in the urine in quantities recognizable by ordinary tests; also that there is no definite relationship between the percentage of sugar in the blood and either the percentage or total amount of sugar excreted by the kidneys. Patients with a permanently high blood sugar may pass comparatively little sugar in their urine, while, in some instances, a normal, or even a subnormal, blood sugar curve may be associated with frank glycosuria. In either condition, examination of the urine alone does not give a correct picture of the case, and, if it is not checked by blood sugar estimations under controlled conditions, may readily lead to mistakes in diagnosis and treatment. As a rule, young diabetics have a lower threshold point for clinical glycosuria than those of middle age, and the threshold rises with advancing years. It is, therefore, important that the presence of even small amounts of sugar in the urine of persons of middle age should not be dismissed as of little significance, unless a series of blood tests have shown that their tolerance for carbohydrates is not seriously defective. Hyperglycemia may exist without clinical glycosuria, that is with an insufficient percentage of sugar in the urine to give the ordinary tests for sugar. The reverse condition, glycosuria with a normal or subnormal percentage of sugar in the blood, is not as uncommon as is generally supposed. Cammidge's observations suggest that many cases of latent diabetes are essentially hepatic in origin, and that so long as the patient

avoids sugar and foods containing sugar as such, he may take any starchy food in moderation without harm, provided that the protein and fat content of the diet are also controlled. He warns that too hasty a diagnosis of diabetes should not be made from the presence of an excess of sugar in the blood nor even from an abnormal blood sugar curve after a test meal of sugar, for other diseases may be associated with hyperglycemia. In the later stages of nephritis, for example, the percentage of sugar in the blood is usually high, often equalling the amount met with in severe diabetes when uremia is imminent, but the blood picture is one of complete metabolic failure, and the end products of nitrogen metabolism are correspondingly increased. Some excess of sugar in the blood is usually found in patients suffering from cariovascular diseases with high blood pressure, even when there is little or no indication of renal disturbance. Carcinoma is another condition in which it is said that there is often moderate hyperglycemia. (From *Practitioner, London* 104: No. 2, (Feb. 1920); through *Jour. Amer. Med. Assoc.*, Mar. 27, 1920.)

Poisoning by Oil of Eucalyptus.—Auerbach reports a case of poisoning in a man of 47 who had ingested about 20 Cc. of oil of eucalyptus. Half an hour afterward he was found unconscious in bed. Auerbach found the patient cyanotic; with a weak, slightly accelerated pulse, and covered with a cold sweat. The pupils were contracted and fixed. The area of cardiac dullness was increased, and breathing was shallow. Ingestion of milk caused vomiting, and milk lavage brought forth distinct evidence of eucalyptus oil. The condition of the patient slowly improved, and complete recovery followed on the fourth day. Auerbach gives this account of the case because he finds in the literature few reports of poisoning from oil of eucalyptus. (From *Deutsche medizinische Wochenschrift, Berlin*, Oct. 16, 1919; through *Jour. Amer. Med. Assoc.*, Feb. 14, 1920.)

Quantity of Diastase in Normal Urine.—The urine of 114 persons was examined by Saigusa by the one-half hour method of Noguchi and Wohlgemuth. The quantity of diastase thus determined varied from 8 to 64, in the majority of cases ranging from 16 to 32. It had, to a certain extent, a relation to the specific gravity of the urine. The starch paste used by Saigusa in his experiments was prepared from official potato starch by heating it for a certain time to destroy amylopectin contained in it, and then passing it through a filter. The author claims that this starch paste could

well take the part played by the soluble starch of Kahlbaum in this experiment. (*Jour. Amer. Med. Assoc.*, February 21, 1920.)

PREPARATION OF STERILIZED CAMPHORATED OIL FOR INJECTION.—The 1 : 10 solution of camphor in olive oil, which is widely prescribed in French practice for administration by hypodermic injection, may be easily and effectively prepared as follows: Pure olive oil preserved from contact with the air by means of a layer of alcohol (95 per cent.) is heated in a long-neck flask in a boiling water bath until all the alcohol is evaporated. The oil will be perfectly sterilized by this procedure. The flask is then removed from the source of heat, and when the temperature of the oil has fallen to about 40° C. the camphor is added and dissolved. If necessary, the camphor may first be dissolved in a small quantity of ether. The author has prepared more than 5,000 camphor injections by this method, and has never had a case showing any ill effects following the administration. (E. Cabannes, *Bull. Soc. Pharm. de Bordeaux*, 57: 158, 1919; through *The Pharm. Jour. and Pharm.*, Feb. 14, 1920.)

GUAIACOL AS AN ANAESTHETIC.—Dr. Georges Laurens advises the use of guaiacol as an anaesthetic for the more ordinary operations on the ear, nose and throat. As regards the ear, and more especially paracentesis of tne drum, he employs a solution of synthetic guaiacol in oil. The latter should be prepared in the manner recommended by Lucas Championnière. Very pure olive oil should first be treated with chloride of zinc in order to get rid of resinous and proteid substances; then washed with alcohol to remove any fatty acids formed, and finally it should be kept at a temperature of 100° C. for some time. The product thus obtained is extremely pure. Dr. Laurens at first made use of a 1 in 10 solution of guaiacol, but he soon abandoned it in favor of a 1 in 20 solution, as he found that the latter produced quite satisfactory anaesthesia. As regards the technique, he follows very closely that recommended by Dr. Lehmoyez. The ear is cleansed first with tepid sterile water, and then with a solution of carbolic acid. Five or six drops of the guaiacol solution are next introduced into the ear and allowed to remain during 15 or 20 minutes. It is then removed by means of a tampon of cotton wool, so that the passage is quite clear and the operator may see what he is doing. For the operations in the nose and throat, the solution is applied by repeated paintings. The quantity of solution used has

never been more than 2 Cc. It is important to note that anaesthesia is obtained much more slowly than with cocaine. With the latter ten minutes sufficed; but with guaiacol one must wait at least fifteen or twenty minutes. (*Med. Press*, Dec. 31, 1919; through *The Pharm. Jour. and Pharm.*, Feb. 14, 1920.)

DETERIORATION OF CRYSTALLINE STROPHANTHIN IN AQUEOUS SOLUTION.—Experiments were undertaken by Levy and Cullen to ascertain the cause of the deterioration of aqueous solutions of strophanthin in relation to the altered hydrogen-ion concentration, and to advise a method for preparing a stable solution for therapeutic purposes. Many of the glass containers commonly used in the laboratory, and most of the glass ampoules employed in marketing sterile solutions for hypodermic or intravenous medication, were found to yield sufficient alkali on autoclaving, to change the reaction of distilled water from $p_H$ 6.0 to $p_H$ 9.0. This increase in alkalinity is sufficient to render biologically inert and partially to decompose aqueous solutions of crystalline strophanthin in the concentration ordinarily employed in the clinic. It is suggested that for clinical use, crystalline strophanthin be dissolved in 0.02 M standard phosphate solution at $p_H$ 7.0, and marketed in hard glass ampoules, thereby insuring stability of reaction with preservation of biologic activity. (From *Jour. Exper. Med., Baltimore*, Mar. 1, 1920; through *Jour. Amer. Med. Assoc.*, April 10, 1920.)

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## EXTENSION OF GERMAN CHEMICAL INDUSTRY.*

BY TRADE COMMISSIONER C. E. HERRING.
BRUSSELS, BELGIUM.

That the German chemical industry is determined to regain its former ascendancy in world markets if possible is indicated by a further increase in the capitalization of large German establishments. At a recent meeting of the companies mentioned below, which grouped themselves about two years ago, increased capitalization was decided upon, although the capitalization was also increased when the group was organized. The new issues will bring the total capitalization to 1,073,520,000 marks, distributed as follows:

* From *Commerce Reports*, December 31, 1919.

| | Present Stock Marks. | New Stock Common Marks. | New Stock Preferred Marks. | Total Marks. |
|---|---|---|---|---|
| Badische Anilin.. | 90,000,000 | 90,000,000 | 72,000,000 | 252,000,000 |
| F. Bayer & Co... | 90,000,000 | 90,000,000 | 72,000,000 | 252,000,000 |
| Hoechts..... | 90,000,000 | 90,000,000 | 72,000,000 | 252,000,000 |
| Cassela & Co.... | 45,000,000 | 45,000,000 | 36,000,000 | 126,000,000 |
| Stede Treptow... | 33,000,000 | 33,000,000 | 26,400,000 | 92,400,000 |
| Greisheim..... | 25,000,000 | 25,000,000 | 20,000,000 | 70,000,000 |
| Weiler ter Meer.. | 10,400,000 | 10,400,000 | 8,320,000 | 29,120,000 |
| Total..... | 383,400,000 | 383,400,000 | 306,720,000 | 1,073,520,000 |

## PRODUCTION OF VANILLA IN THE SOUTH INDIAN OCEAN.

By Vice-Consul E. A. Feibelman,

TANANARIVE, MADAGASCAR, JANUARY 19, 1920.

The production of vanilla beans in Madagascar and dependencies, including the Comoro Islands, and in the islands of Reunion and Mauritius for the season 1919–20, has been established as follows:

| Madagascar and dependencies: | Pounds. |
|---|---|
| Comoro Islands..... | 403,204 |
| East Coast..... | 423,503 |
| Nossi-Be..... | 110,230 |
| Total..... | 936,937 |
| Mauritius..... | 2,646 |
| Reunion..... | 198,414 |

Statistics just received by the consulate from the governor of the Seychelles Islands indicate that the vanilla production in that archipelago is estimated at 6,614 pounds of cured vanilla for the year 1919.—From *Commerce Reports*, March 19, 1920.

## NEWS ITEMS AND PERSONAL NOTES.

Decease of Frank G. Ryan.—The decease of Frank G. Ryan, President of Parke Davis & Co., at his home in Detroit on April 20th, is announced. An appropriate memoir of this eminent and influential character in the drug trade will be published in an early number of the American Journal of Pharmacy.

FAIRCHILD BROTHERS AND FOSTER SECURE ADDITIONAL BUILDINGS.—The growing business of this well known firm engaged in the manufacture of pharmaceutical specialties, has necessitated additional facilities. They have recently acquired the properties Nos. 70, 72, 74, 76 Laight Street, 413 Washington Street and No. 428 Greenwich Street, New York.

This entire space is to be occupied by Fairchild Brothers and Foster for offices, warerooms and factory purposes.

THE AMERICAN DRUG MANUFACTURERS' ASSOCIATION ENDORSES THE COÖPERATIVE PUBLICITY PLAN OF THE A. PH. A.—At the annual meeting of this Association held at the Biltmore Hotel, New York, April 13, the following resolution of indorsement was adopted:

*Resolved*, That the American Drug Manufacturers' Association endorse the plan of the Federation Committee of the American Pharmaceutical Association for coöperative publicity in American Pharmacy as set forth in the six enumerated propositions in the Committee's report for 1918 through 1919, and that the President be and is hereby instructed to appoint a Committee on Publicity of three members whose chairman shall sit on the National Committee on Pharmaceutical Publicity. And be it further

*Resolved*, That the Committee on Publicity be authorized to extend a sum not exceeding $200 per annum.

The coöperative publicity plan endorsed by the preceding resolution is as follows:

1. Each national association invited to send delegates to the Federation Conference held in Chicago last year (1918), be requested to appoint a committee on publicity and the chairman of each committee thus chosen or some other representative of the particular organization shall constitute a national committee on pharmaceutical publicity, to which shall be added as an ex-officio member the editor of the *Journal of the American Pharmaceutical Association*.

2. Certain pages of each issue of the *A. Ph. A. Journal* (not to exceed six at first) shall be set aside for the reproduction of matter furnished by members of the national committee on publicity; said matter consisting of journal editorials, abstracts of papers and news items that are of interest to the public.

3. All such material described in Section 2 shall be sent to the editor of the *Journal of the A. Ph. A.* at least ten copies of each

such articles being furnished by the contributor. It shall be the duty of the editor of the *A. Ph. A. Journal* to submit each article to each member of the national publicity committee, and if one negative vote is recorded such article will not be published.

4. All approved articles which have been published on the special pages of the *A. Ph. A. Journal* described in Section 2 will be sent as soon as possible after publication in the *Journal* as reprints preferably in sheet form, to a selected list of newspapers and magazines; the list of such publications being compiled by a sub-committee of the national committee on pharmaceutical publicity.

5. The expense of printing, reprinting and mailing reprints to magazines and newspapers shall be apportioned among the several organizations represented on the national committee of pharmaceutical publicity, upon such basis as the committee and its participating associations shall decide.

6. In addition to the publicity method outlined in Sections 2, 3, 4 and 5, the committee shall be empowered to arrange for the publication of special original articles bearing on pharmacy, in popular journals of large circulation; details for such methods of publicity being left to the proposed national committee.